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THE UNIVERSITY OF ALBERTA

THE GENERATION OF ALTERNATIVES AND THINKING STYLES IN ELEMENTARY SOCIAL STUDIES

by

© JAMES MICHAEL WICKS

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

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FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled "The Generation of Alternatives and Thinking Styles in Elementary Social Studies" submitted by James Michael Wicks in partial fulfilment of the requirements for the degree of Doctor of Philosophy.

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ABSTRACT

The problem for the study incorporated the following phases: (a) An investigation of the extent to which elementary students can cope with the generation of alternatives in a social studies context, (b) An examination of the effects of convergent and divergent thinking styles on the ability to generate alternatives, and (c) A report on the ability of elementary students to generate alternatives in terms of Piaget's cognitive development model and Kohlberg's moral development model.

One hundred and twenty seven, nine and eleven year old students were categorized according to convergent and divergent thinking ability. They were shown a film loop depicting a problem situation which involved vandalism. The students were asked to generate suggested courses of action to cope with the problem, and possible consequences to those actions. Additionally, each student was asked to choose a course of action and offer a reason for the choice.

The alternatives and choices of action were examined for various aspects of inquiry and reasoning within a Piagetian framework. The reasons offered for choices of action were examined in the context of Kohlberg's moral development theory. Analysis of variance and multiple comparisons tests were applied to the quantitative aspect of the data.

The results indicated that students with higher divergent thinking ability generated more alternatives than students with lower divergent thinking ability, and that older students generated more alternatives than younger students.

The aspects of inquiry and reasoning, which emerged from the data, included the classes or types of suggested courses of action, the actual choices of action made by the students, impractical choices, choices inconsistent with initial suggestions and reasoning type statements. Irrespective of thinking style or age, the students suggested and chose similar courses of action, made appreciable numbers of impractical choices and offered very few reasoning type statements. Thinking style did not appear to affect choices inconsistent with initial suggested courses of action. However, younger students made substantially more choices of this type than older students, a far from negligible proportion of each age level made such choices.

No connections between moral development and thinking style or age were yielded by the attempt to view the data from the Kohlberg perspective.

The investigation indicated that elementary students appeared to be capable of generating a satisfactory basis for inquiry and valuing, in terms of realistic alternatives in the form of suggested courses of action and consequences. However, they displayed inconsistency in making decisions about the alternatives, and offered very few reasoning type statements.

The results seemed to indicate that many elementary school students have the capacity to benefit from experience and instruction in various aspects of inquiry processes. The results also appeared to indicate that many, especially younger, elementary school students might experience difficulty in achieving mastery of complete inquiry or valuing processes.

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CHAPTER 1

THE CONTEXT OF THE STUDY

INTRODUCTION

Current social studies theory emphasizes the teaching of inquiry (Fenton, 1967; Cox, 1969; Massialis, 1969), and the related processes of problem solving (Miklos and Miklos, 1971; Chapin and Gross, 1972), decision making and valuing (Raths, 1966; Clegg and Hills, 1968; Kaltsounis, 1970; 1971). This emphasis upon the teaching of inquiry, problem solving, valuing and decision making has been advocated as a means of producing citizens who can apply disciplined thought to their own problems, the problems of their communities and to data generally. The need for such people has been highlighted by the burgeoning of knowledge and the ever increasing speed of change (Toffler, 1970) which society is experiencing.

The rationale for the modern social studies includes the argument that students should be taught inquiry skills and processes so that they can, as adults, approach social problems, make decisions and form values in a rational, systematic manner in the context of continual societal change. Current social studies theory would advocate, in general, that such skills should begin to be developed at the elementary level.

This study is concerned basically with the ability of elementary students to generate alternative courses of action when faced with a social problem. The generation of alternatives has been identified as an important aspect of inquiry, problem solving, valuing and decision making.

BACKGROUND OF THE STUDY

This section of the chapter includes a discussion of some inquiry and valuing models which display features connected with the generation of alternatives. The section also discusses the similarities between problem solving and inquiry models, the connections between valuing and decision making models, and the differences which can be noted between inquiry/problem solving models and models for valuing/decision making.

Inquiry, Problem Solving, Valuing and Decision Making Models

The need to teach students to approach social problems in a systematic way has led to a great deal of research into the general area of inquiry, problem solving and valuing. The development of models made up of phases or stages which appear to be essential for sound inquiry, problem solving or valuing has been a by-product of this research. The models incorporate plans for approaching problems, inquiring or valuing through logical stages, each of which requires appropriate skills.

A phase incorporating the generation of alternatives of various kinds appears in many models. In some models, alternative hypotheses are called for. Others suggest that inquirers generate alternative possible solutions to a problem, which seems to be much the same as formulating alternative hypotheses. Some models advocate the generation of alternative trials of solutions, or consequences of an action, or implications of a decision.

A brief examination of some of these models is presented at this stage for the following purposes. First, the appearance in them of a phase connected with the generation of alternatives can be demonstrated. Second, the similarities and distinctions between inquiry, problem solving, valuing and decision making models can be noted.

Models for Thinking

The modern prototype for the models was provided by Dewey (1910). While examining thought processes in connection with problem solving, Dewey produced a model made up of five phases which are summarized below. In this model and in others presented in this section, phases connected with the generation of alternatives have been marked with asterisks.

1. Recognition of a problem (Definition)
2. Analysis (Intellectualization, data)
*3. Suggestions of possible solutions (Hypotheses)
4. Testing of consequences (Reasoning, verification)
5. Judgment of a selected solution (Application).

It should be noted that Dewey's model is a general problem solving type. Subsequent research produced many such models. Some of these models were of a general nature. Others were designed by social studies educators for use by social studies teachers. In the social studies milieu such models are usually referred to as inquiry models. An example of a social studies inquiry model is provided by Massialis and Cox (1966). It contains the following steps and can be seen to be quite similar to Dewey's (1910) model.

1. Orientation
*2. Hypotheses
3. Definition of terms
4. Exploration of hypotheses
5. Evidencing
6. Generalization.

Recent trends in social studies theory and practice have indicated a concern for valuing, values clarification and decision making. Models to assist in these processes have been developed. These models display phases which incorporate the generation of some type of alternatives. An example of a valuing model is provided by Clegg and Hills (1968).

1. Observation. Determination of facts
2. Discrimination of relevant information
*3. Enumeration of alternatives
*4. Noting of consequences
5. Decision on a course of action.

The Generation of Alternatives

Though more detailed discussion of alternatives will be presented in Chapter 2, the models outlined here indicate the recurring emphasis placed upon the generation of alternatives at various stages during problem solving, inquiry and valuing by scholars who have examined these processes. The ability to generate alternatives suggested itself as a skill sufficiently important to investigate at the elementary level, at a time when curriculum planners are stressing the desirability of teaching elementary students to inquire, to solve social and personal problems and to clarify values.

Inquiry and Problem Solving

An examination of models labelled "problem solving," such as Dewey's (1910), and "inquiry" (in the social studies context), such as that of Massialis and Cox (1966), indicates that they are quite similar. For practical purposes they can be regarded as the same process.

The close similarity, amounting virtually to equation, between problem solving and inquiry in the milieu of social studies has been recognized clearly. The terms "problem solving," "inquiry" and also "reflective thinking" tend to be equated in meaning by modern theorists of the subject. Massialis and Cox (1966) used the term "reflective thinking" in connection with inquiry. According to Cox (1969), inquiry and problem solving are inseparable. Kaltsounis (1970) equated the inquiry method with the problem solving approach. Miklos and Miklos (1971) noted that "problem solving," "inquiry," and also "discovery" can be, and are, used as synonymous terms. Beyer (1971) argued that inquiry revolved around defining and solving a problem. Chapin and Gross (1972) defined inquiry as a term inclusive of problem solving, as well as discovery learning and induction. An examination of problem solving and inquiry models supports the perceptions of these researchers.

Valuing and Decision Making

Raths (1966) argued that the continual flux in values in modern society necessitates that students be taught how to clarify their values and also the value positions of others. This argument is the basic rationale for the recent interest in valuing and decision making in social studies, and development of appropriate models for process, such as that of Clegg and Hills (1968).

An examination of Clegg and Hills' (1968) valuing model suggests that the terms "valuing model" and "decision making model" can be equated. The Clegg and Hills model culminates in a personal decision on a course of action. Valuing models developed by Raths (1966) and Kaltsounis (1971) display a similar characteristic (see Chapter 2). Valuing models incorporate the making of a decision about values and subsequent action. "Decision making" refers to decisions made after a valuing process has been undertaken. For the purposes of this study, the terms "valuing model" and "decision making model" are held to be synonymous.

Similarities and Distinctions Between Problem Solving/Inquiry Models and Valuing/Decision Making Models

A salient point emerging from an examination of the models outlined above is the incorporation within valuing/decision making models of an inquiry/problem solving component. In this point lies the chief similarity between the two types of models. Effective valuing and decision making depend upon sound inquiry. Kaltsounis (1970; 1971) was aware of this connection and claimed that inquiry should be presented as a vehicle for the development of social decision making skills, and not as an end in itself. In making this claim, Kaltsounis appears to have developed perceptions similar to those of Crabtree (1967), who maintained that there is no guarantee that social science (e.g. history, geography, economics or political science) decision making will be transferred automatically to social decision making. Perception of such connections between problem solving and decision making appears to be valid, from a scrutiny of the models.

The feature which distinguishes valuing/decision making models from the problem solving/inquiry type is focus on decision leading to commitment to a personal value position and action on that commitment. In decision making and valuing, inquiry has been applied to the affective domain of personal values, thus taking it a step further than the solution of relatively impersonal problems. This distinction has been recognized by Crabtree (1967), who noted that there are two types of inquiry: Inquiry within individual social sciences and inquiry aimed at social decision making. Irrespective of whether models focus on problem solving/inquiry or valuing/decision making, the ability to generate alternatives appears to be essential.

Styles of Thinking

Inquiry involves thinking. Models are intended to facilitate effective thinking about various kinds of problems. Social studies theorists have been aware of the connection between thinking and inquiry. The Thirty Seventh Year Book of the National Council for Social Studies (1967) is an example of the interest displayed in the connection between various aspects of thinking and inquiry in social studies.

Writing in the Thirty Seventh Year Book (1967), Bennie, for example, advocated that social studies concentrate on the development of thinking skills to equip people for life in the changing contemporary world. In the same issue, Taba outlined strategies for the development of thinking skills via levels of cognitive tasks. The interest displayed in the Year Book was concerned mainly with developing the ability to think, and inquire, logically about social problems. Within the last two decades, research concerned with the intellect and intelligence has produced other perspectives on thinking upon which this study focusses more directly.

One aspect of recent research has been connected with styles of thought. Guilford's (1950; 1956; 1959) research indicated that the intellect appears to consist of many factors representing specific abilities. In his research on the structure of the intellect, Guilford (1950; 1956; 1959) discerned two major groups of factors: Thinking and memory. Within the thinking factor he delineated three divisions: Cognitive (discovery) factors, production factors and evaluation factors. Within the production factors he claimed that two types of abilities were operative: Convergent thinking abilities and divergent thinking abilities.

This study has focussed on convergent and divergent thinking abilities, rather than other aspects of Guilford's model of the structure of the intellect, because they appear to be abilities which could affect performance in using the skills of the inquiry process. It has been claimed, for example, that schooling, in general, stresses convergent abilities to the detriment of divergent thinking which, in turn has been associated with creativity (Getzels and Jackson, 1962). Research has been conducted in order to assess the degree to which the two abilities are distinguishable from each other (Vernon, 1964; Moss and Duenk, 1967; Cropley, 1972). In general, the results of this research have indicated that the two abilities are identifiable and that they are styles or modes of thought rather than fundamental and independent aspects of intellect as Guilford (1956) appeared initially to regard them. Instruments which attempt to measure divergent thinking abilities have been developed (Torrance, 1966; Wallach and Kogan, 1965).

Convergent thinking was defined by Guilford (1959) as a process which uses information to seek a recognized best, or conventional, answer. Divergent thinking, according to Guilford (1959), involved thinking in different directions, searching and seeking variety. Divergent thinking abilities become operative, apparently, when there is no uniquely correct answer to be obtained from information.

Awareness of a distinction between identifiable modes, or styles, of thought prompted a question concerning the effects of these styles on the ability of students to inquire generally, and also to cope with essential inquiry skills such as the generation of alternatives. For example, would individuals who display pronounced divergent thinking abilities generate more and, perhaps, qualitatively better alternatives, in a problem situation, than those who are markedly convergent in their thinking? The study was designed to examine the effects of convergent and divergent thinking styles on the ability to generate alternatives.

Developmental Constraints

Two areas of research on child development seem to be pertinent to investigations concerned with elementary school children. One is Piaget's (1952) cognitive development model. The other is Kohlberg's (1963; 1964; 1966) moral development scheme, which was based on Piaget's (1932) work.

Piaget (1952) suggested a stage-age cognitive development model which included a concrete operations phase (ages 7-8 to 11) and a formal operations stage (age 11+). The ages of the students who participated in the study ranged from 7 to 11 years. This age range suggested an opportunity to examine the performance of students, both at the concrete operations stage and also bordering on the formal operations phase, at generating alternatives.

Kohlberg (1966) developed a six phase model of moral development. As with Piaget's model, the opportunity to examine and report on the reactions of an age-range of elementary students to a social problem, in the context of Kohlberg's model, was present.

This study was conducted partly with the objective of reporting on the performances of students as they related to the development models of Piaget and Kohlberg.

THE PROBLEM

The problem for the study can be stated as follows:

a) To investigate the extent to which elementary students can cope with the generation of alternatives in a social studies inquiry context.

b) To examine the effects of convergent and divergent thinking styles on the ability to generate alternatives.

c) To report on the ability of elementary students to generate alternatives in terms of

  i) Piaget's cognitive development model.
  ii) Kohlberg's moral development model.

A diagrammatic representation of the study is provided on page 12.

The Generation of Alternatives

In order to conduct the study, a stimulus for the generation of alternatives in a social studies setting was selected. This stimulus was a film loop, Spray Paint (Moore and Woodruff, 1969) which showed two elementary school age boys engaged in an act of vandalism.

Assessment of Convergent Thinking Abilities

The instrument chosen was Raven's Progressive Matrices (Raven, 1956). Both Standard and Coloured versions were used in the study. Each exercise in this instrument allows of only one correct answer, thus it fits well into Guilford's (1956; 1959) concept of convergent thinking.

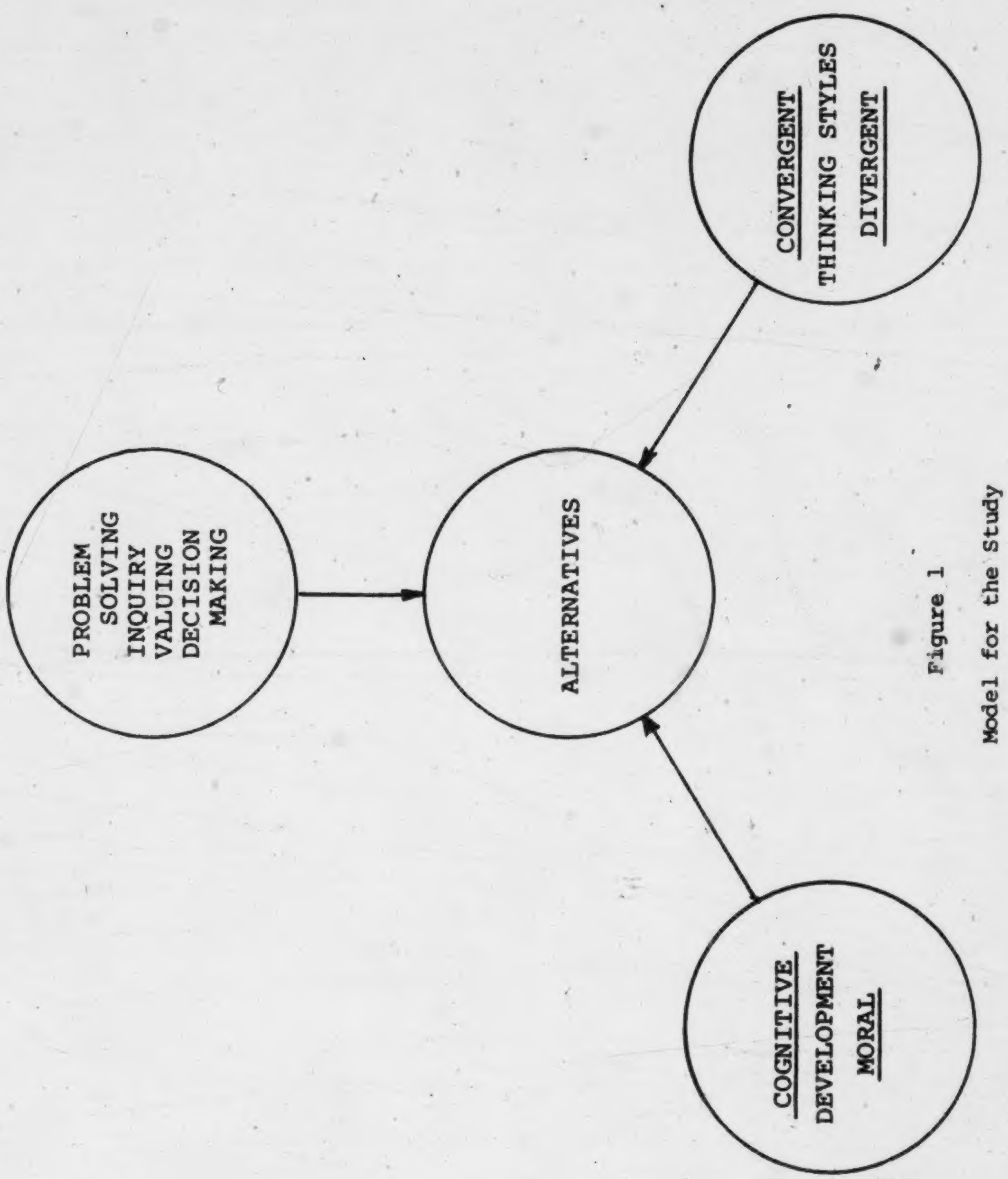
PROBLEM
SOLVING
INQUIRY
VALUING
DECISION
MAKING
ALTERNATIVES
CONVERGENT
THINKING STYLES
DIVERGENT
COGNITIVE
DEVELOPMENT
MORAL

Figure 1

Model for the Study

Assessment of Divergent Thinking Abilities

The instrument selected was that of Wallach and Kogan (1965), which was developed during their research on modes, or styles, of thinking in young children. Each item in this instrument is completely open ended. In general, the instrument requires an individual to seek variety and think in different directions. It appears to meet Guilford's (1956; 1959) concept of divergent thinking. There is no unique, correct response to any item.

Categorization of Students According to Convergent and Divergent Thinking Abilities

The convergent and divergent instruments were administered to all students in the sample. The students were ranked according to their scores. Medians were established for both convergent and divergent results. Students who scored above the median in each case were categorized as highly convergent or highly divergent for the purposes of the study. Those below the medians were categorized as having low convergent or divergent ability. This procedure allowed the formation of four categories: A category which rated high on both measures; a category which was low on both; and two categories which were high on one measure and low on the other. This method of categorizing was deemed necessary because any individual will display some ability in both styles of thought.

The categories were labelled High Convergent-High Divergent; High Convergent-Low Divergent; Low Convergent-High Divergent; and Low Convergent-Low Divergent. Convenient short descriptions of the categories, which were used occasionally, were found to be High-High; High-Low; Low-High and Low-Low. In using these short identifications the convergent dimension was used first consistently throughout the study. (See Diagram on page 16.)

THE RESEARCH SETTING

Design of the Study

The design for the study was suggested by Flavell and others (1968). Essentially, Flavell's design consisted of devising an instrument which was felt to be appropriate for the task under investigation and having students of various grades react to it.

The Flavell investigations suggested that a study involving a range of students at the elementary level might yield useful comparisons of the ability to generate alternatives at various age levels. The present study focussed on students at the ages of seven, nine and eleven years. The age range covered the elementary level from second to sixth grades.

Students in each of these age groups were categorized according to their convergent and divergent thinking abilities. The four categories of High-High, High-Low, Low-High and Low-Low were formed at each age level. Students in each category at each age level were asked to react to the film loop, Spray Paint (Moore and Woodruff, 1969) by generating alternatives.

Diagrammatically, the design of the study can be presented as in Figure 2 (p. 16). The basic design has been taken from Flavell (1968) and modified to incorporate the categories used in this study. The developmental constraints which have emerged from the work of Piaget and Kohlberg have been added.

The design allows for comparison of performances across the three age groups in general. It also allows for comparison of performances among similar categories at the three age levels, and of performances amongst the four categories within each age level.

The study involved one hundred and twenty students, forty at each age level and ten in each of the four categories at each age level.

Hypotheses which the Study Sought to Investigate

The study investigated the following hypotheses which are stated in the null form.

1) There will be no significant mean differences among seven year old students designated as a) High Convergent-High Divergent b) High Convergent-Low Divergent c) Low Convergent-High Divergent and d) Low Convergent-Low Divergent in their ability to generate alternatives.

2) There will be no significant mean differences among nine year old students designated as a) High Convergent-High Divergent b) High Convergent-Low Divergent c) Low Convergent-High Divergent and d) Low Convergent-Low Divergent in their ability to generate alternatives.

3) There will be no significant mean differences among eleven

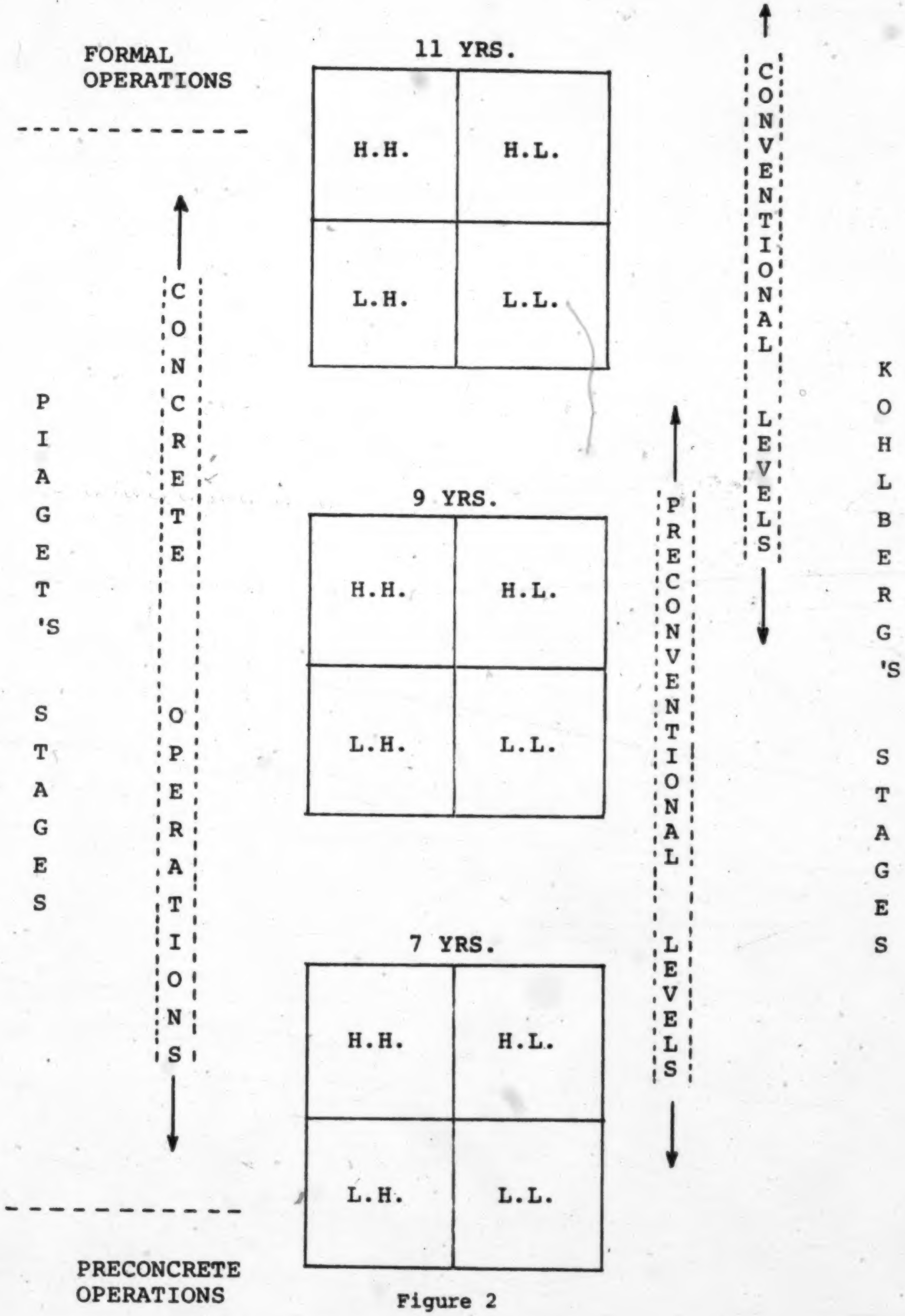
FORMAL OPERATIONS
11 YRS.
H.H.
H.L.
L.H.
L.L.
9 YRS.
H.H.
H.L.
L.H.
L.L.
7 YRS.
H.H.
H.L.
L.H.
L.L.
PRECONCRETE OPERATIONS
PIAGET'S STAGES
CONCRETE OPERATIONS
CONVENTIONAL LEVELS
PRECONVENTIONAL LEVELS
KOHLBERG'S STAGES

Figure 2

Design of the Study

year old students designated as a) High Convergent-High Divergent b) High Convergent-Low Divergent c) Low Convergent-High Divergent and d) Low Convergent-Low Divergent in their ability to generate alternatives.

4) There will be no significant mean differences among seven, nine and eleven year old students in their ability to generate alternatives.

Questions which the Study Sought to Examine

1) Are there any differences among seven, nine and eleven year old students designated as High Convergent-High Divergent in their ability to generate alternatives?

2) Are there any differences among seven, nine and eleven year old students designated as High Convergent-Low Divergent in their ability to generate alternatives?

3) Are there any differences among seven, nine and eleven year old students designated as Low Convergent-High Divergent in their ability to generate alternatives?

4) Are there any differences among seven, nine and eleven year old students designated as Low Convergent-Low Divergent in their ability to generate alternatives.

Additional Analyses of Students' Responses

In addition to the hypotheses outlined above, which lend themselves to statistical analysis, the study included an examination of students' responses in terms of Piaget's cognitive development model and Kohlberg's moral development model. These aspects of the study are reported in descriptive fashion in Chapter 4.

DEFINITION OF TERMS

Functional Definitions

Inquiry/Problem Solving: The process of discovering, articulating and testing ideas and judgements about man and his environment (Massialis, 1969).

Valuing/Decision Making: The process of articulating and testing ideas, in an inquiry/problem solving manner, in order to make decisions about values.

Inquiry Model or Method: Any scheme of suggested, interrelated phases or steps involved in the process of inquiring or solving problems.

Valuing/Decision Making Model: Any scheme of suggested, interrelated phases or steps involved in the process of clarifying values or making decisions about values.

Convergent Thinking: The thought process whereby the thinker uses information to reach a uniquely correct, or recognized best, answer (Based on Guilford, 1956; 1959).

Divergent Thinking: The thought process whereby the thinker uses information to arrive at a variety of different conclusions, any of which may be acceptable (Based on Guilford, 1956; 1959).

Operational Definitions

Alternatives: Any courses of action generated by a student in response to the incident of vandalism presented in the film loop Spray Paint (Moore and Woodruff, 1969).

High Convergent-High Divergent: Students who scored above the medians in the measures of convergent and divergent thinking used in this study.

High Convergent-Low Divergent: Students who scored above the median in the measure of convergent thinking and below the median in the measure of divergent thinking used in this study.

Low Convergent-High Divergent: Students who scored below the median in the measure of convergent thinking and above the median in the measure of divergent thinking used in this study.

Low Convergent-Low Divergent: Students who scored below the medians in the measures of convergent thinking used in this study.

SIGNIFICANCE OF THE STUDY

The significance of the study can be discussed in terms of its appropriateness to the subject area of social studies and its implications for curriculum and teaching strategies.

The study is concerned with inquiry; models for inquiry and extensions of inquiry such as valuing; and thinking processes. These factors have been embedded in general educational and social studies theory since the first two decades of this century, when social studies appeared upon the educational scene (Keller, 1964; Ragan and McAulay, 1973). Their presence in educational theory owes much to the work of John Dewey, whose research and writings over an extended period of time (1888; 1900; 1910; 1916; 1920; 1926; 1934; 1938) formulated the philosophical basis for the so-called Progressive Movement in North American education.

Dewey challenged traditional education on its assumption that the future would be much the same as the past. Perhaps the essential feature of his message for education was to ask the schools to equip youth to cope with change by teaching the skills of problem solving and disciplined thinking per medium of activity method, which involved students as active participants in the learning process rather than as passive receptacles for imparted knowledge.

The spirit of Dewey's ideas pervaded education in North America from the 1920's to the 1950's (approximately the era of the loosely labelled Progressive Movement), and has exercised a continuing influence since that period. However, educators, both during the Progressive period and since that time, have tended to draw selectively and interpretatively upon Dewey's ideas. Undue emphasis was placed upon student activity *per se*, to the detriment of the inquiry aspect of Dewey's theory (LaZerte, 1936; Dickie, 1936; Kilpatrick, 1951), as it applied to social studies, during the Progressive period, and, also, much traditional-type teaching continued to take place (Lawson, 1937; *Social Education*, December 1939; Wilson, 1938). Nevertheless, the importance of inquiry as an integral facet of social studies was established and has received increased attention in a variety of ways over the last two decades.

Possibly due to the Russian space success embodied in the satellite, Sputnik I, North American education in general, and social studies educators in particular, developed an interest in the inquiry aspect of the academic disciplines as part of a fresh examination of discipline structure. Bruner (1960) was a major influence in directing social studies educators towards teaching the inquiry processes of disciplines. Discipline based social studies programs appeared. Bruner's Man: A Course of Study (1969), based on Anthropology/Sociology, and Senesh's (1966) materials in Economics are examples. An associated development concerned concepts and generalizations from the social science disciplines (Social Studies Curriculum Center of Syracuse, Price, 1965; Martorella, 1971). The basic rationale behind this interest in social science inquiry was the feeling that children, from their earliest school years could, and should, be given the opportunity to experience a discipline as fully as possible at their appropriate developmental levels. Ideally, the experience would encompass the mastery of essential concepts and generalizations from the disciplines by means of learning and using disciplinary research techniques and methods of inquiry.

The most recent trend in social studies has been a movement away from disciplines per se, towards interdisciplinary inquiry using techniques from a variety of social sciences to examine social problems, and also to clarify personal values in relation to social problems. This situation is in harmony with Dewey and also with more recent educational philosophers who drew upon his work, such as Counts (1932), Bode (1938; 1940) and Brameld (1964). Brameld's Reconstruction Theory, an essential point of which appears to be a belief that society should be able to reconstruct itself in the face of continual change, owes much to Dewey, Bode and Counts. It is a logical theory for modern times. Social problems in connection with excess population (Kirman, 1973) for example, promise to provide ample need, in the future, for citizens who can think, inquire and clarify values in a disciplined, objective manner.

Inquiry, then, has always been an important part of social studies theory, and prognostications for the future would appear to suggest that it should remain so. This study, with its focus on inquiry, fits firmly into the general history, current trends and foreseeable future of social studies.

The specific problem for this study is concerned with a skill, or an ability, which appears to be essential for sound inquiry and problem solving. Because inquiry and problem solving appear to provide the basis for valuing and decision making, the generation of alternatives seems essential for these latter processes also. If curriculums are to be based upon inquiry and values clarification processes, research into as many facets of them as possible is appropriate.

Elementary curriculums based upon inquiry and valuing can succeed only if elementary students are capable of grasping and developing the necessary skills and abilities. This study embodies an attempt to assess the degree to which elementary students can cope with what appears to be a vital facet of inquiry. The problem studied in this investigation seems especially appropriate in Alberta, where the K-12 social studies curriculum, Experiences in Decision Making (1971), is based upon values clarification. The design of the study probes the ability of students throughout the elementary grades to generate alternatives. The elementary level is precisely the age range where the maturity of students can be questioned in connection with the ability to inquire and value effectively. The study provides information on this point and is pertinent to the social studies curriculum in Alberta at this time. The study provides a basis for comment upon the validity of constructing curriculums which require students at the elementary level to inquire and value.

The study provides some information about the effects of thinking styles on the ability to handle an aspect of inquiry. This type of information is useful to teachers in as much as it pertains to the characteristics of students. Such information helps form a basis for planning teaching strategies. Convergent approaches may not be suitable for all students for example. Perhaps opportunities to exercise both styles of thought should be provided in a balanced program. It might be necessary to encourage, deliberately, divergency of thought in connection with inquiry and valuing. If styles of thought affect performance in valuing or inquiry, then they should be taken into account when devising instructional strategies.

The extent to which elementary students can cope with inquiry and valuing has a bearing, not only on instructional strategies, but also on materials which might be considered appropriate. The study provides a basis for comment concerning materials in connection with teaching inquiry and valuing processes at the elementary level.

Finally, the study provides some information about the performance of elementary students in terms of cognitive and moral development. Such information is pertinent to both curriculum planning and instructional method because it has a bearing on the capabilities of children at various stages of development.

LIMITATIONS

The following limitations appear to apply to the study.

Conceptual Limitations

Although research has indicated that convergent and divergent thinking are distinguishable styles of thought, the fact remains that they are interrelated to some degree. They are not mutually exclusive styles. Furthermore, research has not fully explored each type of thinking. They may not be unitary phenomena, for example. They could be clusters of abilities.

The concept of generation of alternatives as an essential element of inquiry rests largely upon apparent logic. There is the possibility that inquiry can take place intuitively without proceeding through the phases of an inquiry model. Knowledge of human thought processes is far from complete, as is the knowledge about the operation of these processes in an inquiry context. Inquiry models are, really, idealistic descriptions of what might, or should, take place during inquiry or problem solving, and they are based on what disciplined adults might do. There is also the possibility that the steps in an inquiry process might not necessarily take place in the logical order outlined by so many of the model makers.

Methodological Limitations

The scoring of the divergent thinking instrument presented problems concerning the validity of some students' responses. As will be seen from the description of this instrument in Chapters 3 and 4 , the acceptability of responses rests upon the perceptions of the panel of judges. While high overall percentages of agreement for the various grades and items was achieved, this agreement rests upon the subjective judgements of this group of judges.

With regard to divergent thinking tests, it should be remembered that norms are not available for this type of testing. The divergent ratings for the study, therefore, are applicable only to the group tested. Students rated as highly divergent are high only in relation to the group involved in the study.

No attempt was made to account for the effect of past experience in the generation of alternatives.

The Wallach-Kogan instrument was designed for and used with fifth grade students. In this study, it was used with second, fourth and sixth grade students.

ASSUMPTIONS

1) The students provided a true reaction to the alternatives instrument. There could have been a tendency to provide answers which students felt were "right" or "expected," in spite of encouragement to suggest courses of action irrespective of their rightness. It was impossible to detect whether or not the responses were affected by students' biases towards giving answers which they felt would be socially accepted.

2) Both sexes would identify equally with the characters portrayed in the study. In Spray Paint, the cast is male.

OUTLINE OF THE REPORT

The present chapter has stated the problem and provided an overview of the study. In Chapter 2 research related to the problem and the study will be reviewed. Chapter 3 will report the results of the pilot study and outline the method of conducting the study. An outline of the procedures used to analyze the data, and a report on the results of the data analysis and other observations made during the study will be provided in Chapter 4. Chapter 5 will contain a summary of the study and a discussion of conclusions, implications and suggestions for further research.

SUMMARY

Inquiry/problem solving and valuing/decision making are vital aspects of modern social studies. The generation of alternatives is an important aspect of both inquiry and valuing. Convergent and divergent styles of thinking could affect the performance of elementary school students with the generation of alternatives. This study incorporates an examination of the ability of elementary students to generate alternatives in a social studies context; an investigation of the effects of thinking styles upon that performance; and a report upon the performance with alternatives in terms of the developmental constraints suggested by Piaget (cognitive) and Kohlberg (moral).

CHAPTER 2

SURVEY OF LITERATURE

INTRODUCTION

The purpose of this chapter is to examine literature and research pertinent to inquiry, convergent thinking and divergent thinking. The chapter also incorporates a brief discussion of the development schema of Piaget (1952) and Kohlberg (1966) to indicate their place in the study. Therefore, this chapter has been divided into three main sections. The first section deals with inquiry and the associated processes of problem solving, valuing and decision making. The second section has been devoted to convergent and divergent thinking. The third section is concerned with the development models of Piaget and Kohlberg. Each of these sections contributes to the construction of a theory framework for the study.

Inquiry is the central concern of this study. Inquiry models are an important aspect of the process and the generation of alternatives has been identified as an essential component of many models. Numerous factors could affect the teaching of the skill of generating alternatives and the successful implementation at the elementary level of inquiry strategies. Some of the factors in addition to styles of thinking and development factors, which come readily to mind, are materials, questioning techniques, teaching strategies, subject matter, learning activities and planning. It is not suggested that this is an exhaustive list. However, such a list provides a framework of theory pertaining to inquiry. The place of the present study within this framework is illustrated in the paradigm depicted in Figure 3 (page 30).

INQUIRY

Why Teach Inquiry/Problem Solving and Valuing/Decision Making?

Support for the teaching of inquiry processes has loomed large in general educational and social studies theory throughout much of the Twentieth Century. One line of argument has focussed on educational and social studies objectives, in so far as they pertain to the preparation of citizens who can think logically and objectively in the face of continual changes in society and the nature of knowledge.

The production of thinking citizens who can cope with change was part of the burden of Dewey's message for education. The point has been repeated continually in various forms by both general educational and social studies theorists during the last fifty years. For example, Kilpatrick (1925) argued that the teaching of problem solving could assist in meeting the challenge of an everchanging society. Gray (1935) advocated the teaching of problem solving as a means of producing democratically minded citizens capable of examining, and resisting, if necessary, totalitarian proposals for societal change. Hullfish and Smith (1961) claimed that the teaching of modes of inquiry to young people is essential if they are to continue to learn during adult life. One aspect of profitable adult education is based upon the ability of adults to choose and select wisely learning activities which will assist in coping with change. Leef (1968) was concerned

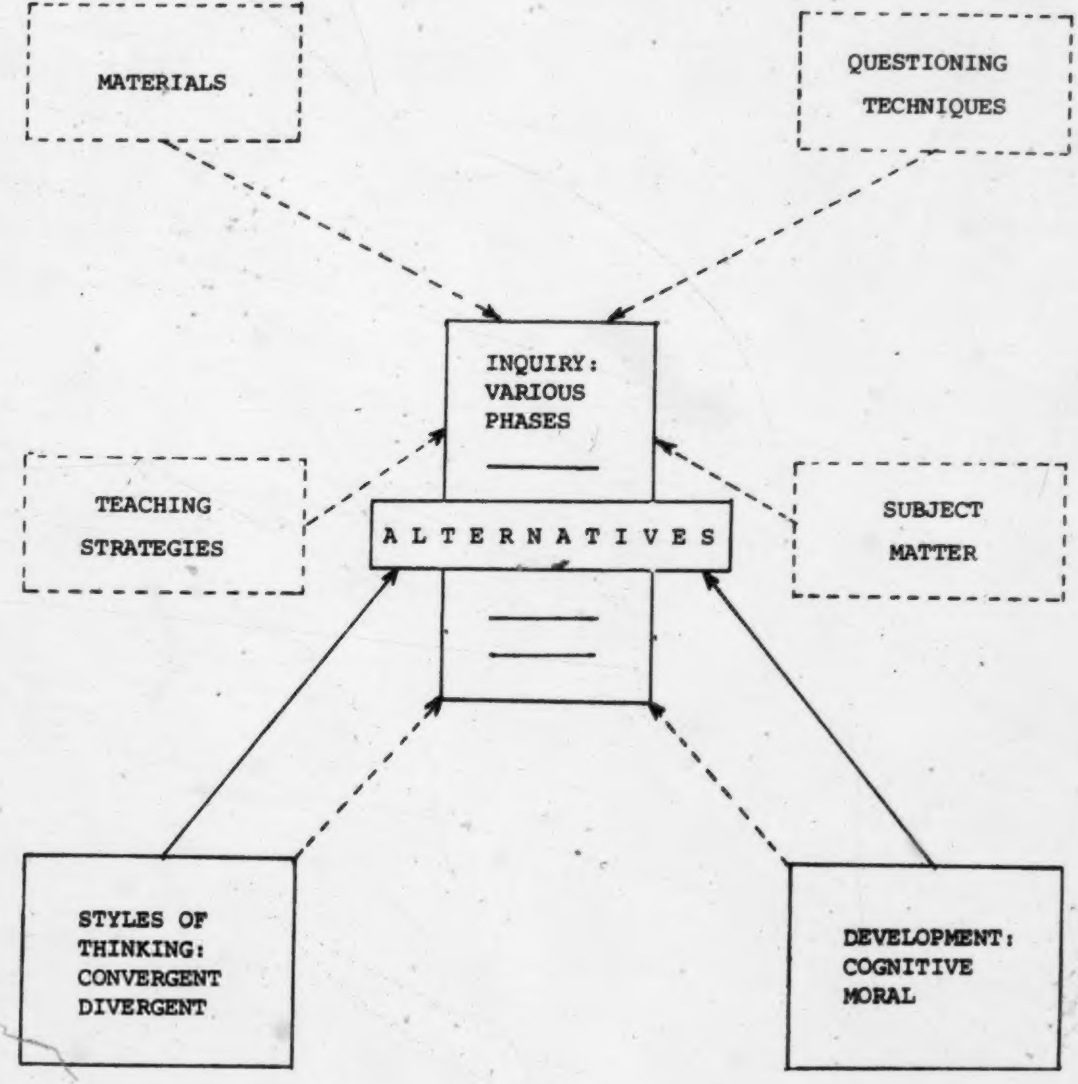
MATERIALS
QUESTIONING TECHNIQUES
INQUIRY: VARIOUS PHASES
TEACHING STRATEGIES
ALTERNATIVES
SUBJECT MATTER
STYLES OF THINKING: CONVERGENT DIVERGENT
DEVELOPMENT: COGNITIVE MORAL

Figure 3

The Place of the Study in Relation to Inquiry about the power of the media in modern society. Leef felt that the ability to inquire is necessary if citizens are to analyze critically the media in the interests of good citizenship and government.

In the social studies field, recent examples can be found to echo the earlier general educational theorists' concern for coping with change in society and knowledge. Banks and Hogan (1968) claimed that students often become disillusioned when changes occur in interpretations of historical events. They felt that teaching inquiry would help to prevent such disillusionment.

Fenton (1967:6-27) advocated teaching of inquiry in social studies and history as a means of coping with the knowledge explosion and continual change in the nature of knowledge. He pointed out that the amount of leisure time available in society was increasing. He felt that teaching inquiry method in history and social studies could help to ensure that increased leisure time would be used profitably and productively. Fenton (1967) also noted that information becomes obsolete rapidly in modern times. Teaching inquiry provides an answer to this problem, because mastery of the process allows the user to employ the most reliable information. Miklos and Miklos (1971) stressed the need to teach inquiry skills so that students would develop the ability to cope with societal change.

Massialis (1969) and Cox (1969) encapsulated the social studies perspective on the teaching of inquiry. They emphasized teaching inquiry in order to produce people capable of making objective judgments about social institutions. They saw the general aim of social studies as the preparation of future citizens to think critically and inquiringly.

The application of inquiry to the area of personal values, in valuing and decision making, is based on the same rationale as inquiry itself. Raths (1966), who developed a values clarification model, argued that the continual flux of values in modern society necessitates that students be taught how to clarify their own values and also the value positions of others. Decision making about values, then, appears to be important in the context of change as it is being experienced by the modern society.

The Importance of Inquiry to Social Studies as a Subject Area

In addition to regarding inquiry as an essential in the preparation of citizens to cope with change, social studies theorists have viewed the process as a means by which social studies can be organized into a manageable subject area.

Bruner (1960) advocated that individual social sciences should be taught in schools. His perspective on social studies was part of a renewed interest in the structure of academic disciplines which appeared during the 1960's. Bruner (1960) was interested particularly in the disciplinary processes, which he defined as modes of inquiry. Though Bruner (1971) modified this view later, he felt that these modes of inquiry should be taught to students, and that school students should use the same methods of inquiry as scholars in the disciplines. Foshay (1961) and King and Brownell (1966) held similar views. These people felt that social studies should be organized on the basis of the social science disciplines in general and on the inquiry processes of the social sciences in particular.

Broudy (1962), while discussing the problem of curriculum in connection with social studies, suggested that a course based on inquiry was one way of meeting the problem of accommodating the various social sciences within the social studies framework. The absence of any recognized interdisciplinary framework was noted, also, by Engle (1963), who suggested inquiry might be regarded as the structure of social studies. This problem of structure in social studies was examined in detail by Parker and Rubin (1966). They advocated teaching a general inquiry method which could be applied to as wide a range of disciplines as possible.

Ausubel (1967) had a grasp of the history of inquiry in education throughout the twentieth century. Noting that modern interest in inquiry began in the Progressive Education movement, Ausubel (1967) claimed that overexaggeration of the value of pupil activity, involving unstructured and undirected activity, had accompanied it. However, he noted, also, that experience in handling inquiry was necessary for the successful grasping of scientific method and problem solving. Ausubel (1967) claimed that such experience should be given to elementary students to prepare them for more abstract work.

Perhaps the most direct statement of the vital position held by inquiry in modern social studies theory has been provided by Ellis (1971). After an examination of the philosophical basis of contemporary viewpoints on social studies, Ellis (1971) claimed that the "new social studies has built its rationale upon . . . inquiry" (pp. 195-203).

Models for Inquiry/Problem Solving and Valuing/Decision Making

One practical expression of the interest in inquiry/problem solving and valuing/decision making has been the production of models which outline various phases of these processes. This section of the review of literature is devoted to outlining and discussing a number of models which have been produced over the years. There are several purposes in providing actual examples of the models. The examples are used to illustrate the similarities amongst all models; to provide concrete instances which demonstrate the difference between problem solving/inquiry models and those which focus on valuing/decision making; and to demonstrate the presence in the models, implicitly or explicitly, of a phase concerning the generation of alternatives. Phases of the models which appear to be connected with the generation of alternatives have been marked with asterisks.

Dewey's (1910) model was noted in Chapter 1 as the prototype for subsequent models. The following models are examples of frameworks for inquiry and problem solving which appeared at various times up until the 1950's. These models appear to be applicable to problem solving in general.

Gray (1935) suggested a five-phase model:

1. Sensitivity to problems.

2. Knowledge of problem conditions.

*3. Suggested solutions or hypotheses.

4. Subjective evaluation.
5. Conclusion or generalization.

Humphrey's (1948) model contained a stage concerned with generation of alternatives:

1. A problem situation.
2. Motivating factors.
*3. Trial and error.
4. The use of association and images.
5. A flash of insight.
6. Some application in action.

Burack (1950) developed a more detailed model than Humphrey or Gray, but its essentials were similar to theirs, including a stage which called for the ability to generate alternatives. Burack's (1950) model contained eight phases:

1. Clear formulation of the problem.
2. Preliminary survey of the material.
3. Analysis into major variables.
4. Location of critical features.
5. Application of past experience.
*6. Varied trials.
7. Elimination of sources of error.
8. Visualization.

Vinacke (1952) provided a five phase outline:

1. Recognition of the problem.
*2. Manipulation and exploration of some kind.
3. Analysis.

4. Partial solving.
5. Emotional responses.

The similarity between these models and Dewey's (1910) with regard to the presence of a phase which calls for the generation of alternatives is apparent.

When examples of inquiry models which have been developed for use in social studies are examined, similarities with the models outlined above can be noted, including stages which involve alternatives. Fenton (1966) developed a history-social studies inquiry model. It incorporated the following phases:

1. Recognition of a problem from data.
*2. Formulating hypotheses.
*3. Recognition of the implications of hypotheses.
4. Gathering facts.
5. Analyzing, evaluating and interpreting data.
6. Evaluating hypotheses in the light of data.

Massialis and Zevin (1967) produced a five-phase model:

1. Identification and definition of problems.
*2. Looking at alternatives.
*3. Formulating hypotheses.
4. Gathering relevant data.
5. Supporting hypotheses by evidence.

Goldmark's (1968) social studies inquiry model was quite complex and contained the following phases:

1. Problem.
2. Recognition that inquiry is needed.

*3. Abduction of alternative hypotheses.

4. Gathering data.

5. Analyzing alternative hypotheses.

6. Identifying the criteria.

7. Identifying values and assumptions.

8. Inquiry into inquiry.

Miklos and Miklos (1971) suggested a basic outline for social studies inquiry:

1. Definition of a problem.

*2. Hypothesizing.

3. Drawing logical inferences.

4. Gathering relevant data.

5. Generalizing.

Beyer (1971) produced a very similar model:

1. Definition of a problem.

*2. Hypothesizing answers to this problem.

3. Testing the hypotheses against evidence.

4. Drawing conclusions.

Social studies models which focus on valuing/decision making can be seen to have inquiry as their basic component, and stages which suggest the generation of alternatives.

Brim (1962) developed a framework which he called a decision making model. It contained the following steps:

1. Identification of the problem.

2. Obtaining necessary information.

*3. Production of possible solutions.

4. Evaluations of such solutions.

5. Selection of a strategy for performance.

6. Actual performance of an action, subsequent learning and revision.

Raths (1966) directed his model towards clarification of values:

1. Choosing: *Identification of all known alternatives.
   *Assessment of the consequences of all known alternatives.
   Choosing freely from among the alternatives.
2. Prizing: Being happy with the choice.
   Affirming the choice willingly and in public if necessary.
3. Acting: Acting on the choice.
   Repeating the action consistently in some pattern of life.

Clegg and Hills (1968) provided a model similar to that of Raths (1966):

1. Observations. Determination of facts.

2. Discrimination of relevant information.

*3. Enumeration of alternatives.

*4. Noting consequences.

5. Decision on a course of action.

The valuing/decision making model of Kaltsounis (1971) provided for five stages:

1. Children are presented with an unresolved controversial issue.

*2. Children suggest as many alternatives as possible.

*3. Children consider the consequences of each alternative.

4. Children express feelings about each alternative.

5. Children should come to decisions.

The valuing/decision making models outlined above can be seen to have phases connected with alternatives. They are similar to inquiry/problem solving models in that they are based on identifying problems, gathering data, generating and testing hypotheses or possible solutions. However, their focus is on social values. They call for examination of social problems and values by means of problem solving or inquiry techniques. Such examination, in valuing/decision making, is intended to lead to a personal commitment to a value position in relation to a social problem. The process can be applied to personal problems. The decision making occurs in connection with deciding upon a value position and subsequent action in the light of that value position.

Irrespective of whether the models focus on problem solving/inquiry or extend into valuing/decision making, the skill of generating alternatives seems to be essential to the model developers. The models outlined in this section seem to indicate that the generation of alternatives is closely linked with hypothesizing. The ability to hypothesize seems to involve being able to generate various possible solutions when confronted with a problem. Even when hypothesizing is not mentioned explicitly, terms such as "trial and error" (Humphrey, 1948), "varied trials" (Burack, 1950) and "partial solving" (Vinacke,

1952) seem to imply it.

Preoccupation with the generation of alternatives is most noticeable in the models which have been developed for inquiry and valuing in social studies. For example, the generation of alternatives is stated as an explicit step in the models of Massialis and Zevin (1967), Goldmark (1968), Raths (1966), Clegg and Hills (1968) and Kaltsounis (1971). Beyer (1971) and Brim (1962) have stages in their models where the terminology suggests strongly the generation of alternatives. For example, Beyer (1971) has a phase called "hypothesizing answers to this problem," and Brim (1962) incorporated a stage labelled "production of possible solutions."

While the models suggest that generation of alternatives is linked closely with hypothesizing, that is, the generation of alternative hypotheses, the valuing/decision making models indicate that this ability has a further use. Raths (1966), Clegg and Hills (1968) and Kaltsounis (1971) have included a phase in their models which calls for the generation of the consequences of a solution to a social problem, or consequences of actions which appear to constitute the solution of a social problem. The generation of alternative consequences appears to be a form of hypothesizing. The consequences generated seem to be secondary hypotheses which provide a framework for thinking ahead. This device appears to be useful especially in connection with personal, social and valuing problems.

The Concept of Alternatives and Reasons for their Use

Dewey's (1910) concept of alternatives was bound up with the idea of various possible solutions (hypotheses) to a problem being generated by the stimuli of available data interacting with experience. Williams (1960), during discussion of Dewey's model, noted that the generation of alternative solutions under these circumstances is a form of inferencing, the psychological processes of which are not well understood. He suggested, logically, that saturation of the mind with important aspects of the problem might be a prerequisite for fertile generation of possible solutions, and that a considerable amount of trial and error with the alternatives could be essential in many problem solving situations. Furthermore, Williams (1960) noted that a poor supply of alternatives could lead to failure in a problem solving situation, because the problem solver could be left with unprofitable avenues of inquiry. There would not be, in such a case, the potential for flexibility inherent in a situation where there were more, rather than less, alternatives for exploration.

Dewey (1910) himself does not mention alternatives specifically, but his description of the hypothesizing stage indicated that the trained inquirer will generate a number of alternative solutions and test them carefully before selecting the one which seems most appropriate. Dewey's reason for including such a phase in his model rests on his belief that ". . . the use of one suggestion after another as a leading idea [is essential] to initiate and guide observation in the collection of factual material" (Dewey, 1933, p. 107).

The reasons given by other model makers for including a generation of alternatives phase in their models complement and expand Dewey's ideas. Gray (1935) claimed that the generation of alternative solutions is an essential experience in developing problem solving ability, and indicated that the problem solver must initiate the alternatives:

> As the data concerning a problem are collected, possible solutions will be suggested. Some will be obviously worthless, but others will appear sufficiently plausible to merit specific statement. . . . this step is largely ignored in conventional education . . . The student must be allowed to . . . formulate his own hypothesis . . . He cannot learn to think by allowing the teacher to think for him. . . . Problem solving is learned by experience in doing just that. (pp. 353-359)

Gray's concept of alternatives was similar to Dewey's: Various possible solutions to a problem in view of the data available and the experience of the problem solver. Gray worked in a general problem solving context, rather than in a specific subject area.

Burack (1950) examined problem solving in an induction/deduction/geometrical figures context. He viewed alternatives as various possible solutions to a problem in the manner of Gray and Dewey. Burack's reason for including the phase was his belief that variability, by which he meant varied trials, is one of the prime factors conducive to solution.

Vinacke (1952) had the same general concept of alternatives as Dewey and the others. He claimed that manipulation or exploration was necessary in effective problem solving:

> This behavior is invariably found . . . in those

> tasks in which familiarization with the materials is essential before the nature of the problem can be fully realized, or where more than one lead may result in progress. Except for repetition of identical problems, or in very easy and familiar situations, this behavior appears to be a sine qua non of solution. . . . Sometimes manipulation or exploration may be of a random sort, without any evident purpose other than to deal with the materials; at other times, it may be of a deliberate sort, to the end of testing out successively various possibilities. (p. 181)

Fenton (1966) and Massialis and Zevin (1967) applied the general concept of alternatives to the social studies context. Both used a history base. For example, Massialis and Zevin (1967) presented excerpts of poetry to fifteen year old history students and asked them to discover the cultural origins of the poems. Their concept of alternatives was basically that of Dewey, but their alternatives were tied to the solution of an historical problem.

Raths (1966), working in the context of developing a values clarification process, claimed that choice was an essential element in valuing, and that choice depended on the presence of alternatives. He viewed alternatives as possible value positions formulated by an individual from evidence, experience and emotion. He noted the importance of alternative value positions thus:

> This definition of values is concerned with things that are chosen by the individual and obviously there can be no choice if there are no alternatives from which to choose. It makes no sense, for example, to say that one values eating. One really has no choice in the matter . . . Only when a choice is possible, when there is more than one alternative, do we say a value can result. (p. 28)

Goldmark (1968) claimed, "In order to arrive at a solution, the inquirer must analyze and evaluate all possible solutions" (p. 90). Her concept of alternatives and her reasons for using them fit into the basic Dewey concept. Kaltsounis (1971) also has the same concept as Dewey. Kaltsounis argued that alternatives are a vehicle for "weighing pros and cons," which "sharpens the child's ability to think and reason effectively." Beyer (1971) described the hypothesizing process in the context of a social studies topic, Hausa People of Africa. The problem was to find out as much as possible about the Hausa from the evidence of a list of Hausa words and their English equivalents. Beyer's description indicated that he regarded alternatives, in this case, as the various ideas put forward as a result of the stimulus of the evidence. This concept does not differ materially from that held by Dewey and the others discussed in this section.

The broadest concept of alternatives and their use has been suggested by Fraenkel (1973). In a study devoted to outlining strategies for the teaching of students to think and value, Fraenkel (1973) recognized the importance of alternatives in inquiry and valuing. He suggested questioning strategies which might develop the ability to generate alternatives.

Fraenkel's comments about alternatives indicate the scope of his conception of them and also their basic connection with hypothesizing. After outlining many strategies in connection with various aspects of inquiry, Fraenkel (1973) noted:

> Implicit in many of the foregoing strategies has been the need for teachers not only to suggest, but also to encourage students to seek out and offer alternative suggestions, viewpoints, possibilities . . .

> Students can be regularly encouraged to suggest additional hypotheses and explanations. . . . The examination of alternatives is essential if teachers expect to do something other than uncritically accept the views of others (especially the statements of "authorities"). . . . The active pursuit, presentation and discussion of alternative ways of thinking, believing, feeling and acting as a regular feature of classroom life can help bring about the development of critical minds. (pp. 223-224)

To summarize, researchers in the areas of problem solving, inquiry, decision making and valuing conceive of alternatives, in general, as various possible solutions to a problem; possible value positions; possible courses of action or possible consequences of solutions or actions. All of these ideas can be subsumed broadly under the idea of alternative hypotheses. They have included in their models phases connected with the generation of alternatives because logic or experiment has indicated that a wide choice of alternatives increases the possibility of satisfactory solution, guides observation and provides the basis for choice in valuing and decision making.

Two practical points, for the purposes of this study, emerged from this discussion on alternatives. The first concerned the actual number of alternatives generated. This point appeared to be either implicit or explicit in most of the comments made by the theorists. The number of alternatives generated in connection with a problem appears to be important. The second point, made in particularly strong fashion by Fraenkel (1973), indicated that the inquirer, ideally, should generate the alternatives. This study is focussed on these two aspects of the generation of alternatives.

Mastery and Practice in Connection with Inquiry and Valuing

An examination of various models has indicated that the ability to generate alternatives appears to be an essential skill in inquiry and valuing processes. It is not, of course, the only skill involved in inquiry. Cox (1969) summarized the basic skills which are usually mentioned specifically in connection with inquiry. These skills are hypothesizing, deriving implications, seeking evidence, drawing conclusions, drawing analogies, and differentiating between fact and value. Kaltsounis (1971) listed skills such as observing, classifying, analyzing, inferring, hypothesizing and drawing conclusions. All these skills can be seen to fit into the scope outlined in the various models discussed in this chapter, the generation of alternatives being closely linked to hypothesizing.

The skills outlined by Cox (1969) and Kaltsounis (1971) rest on even more basic skills, such as the ability to recognize and use facts (Kilpatrick, 1925; Russell, 1956; Hunt and Metcalf, 1968), to produce evidence (Massialis and Cox, 1966), and to ask questions (Banks and Hogan, 1968; Branson, 1971).

An important facet of the conceptual framework of inquiry concerns the mastery of all these skills and processes. It has been argued that mastery of the various inquiry skills is necessary before inquiry or valuing can be fully implemented by individuals. Suchman's (1967) perceptive examination of inquiry indicated that this process can become an intellectual tool capable of being employed by an individual to extend knowledge, cope with change, evaluate attitudes and values, and make decisions, only when the various skills have been mastered. Chapin and Gross (1972) provided explicit support for Suchman (1967). They claimed that:

> Most of the inquiry-oriented projects presume that the student has acquired most of the traditional social studies skills . . . students need nearly total command of traditional social studies skills . . . before they can carry out very effective inquiry. (p. 153)

Autonomy of control over inquiry and valuing processes, then, depends greatly upon mastery of the various elements in those processes, including the ability to generate alternatives. This question of mastery is connected with ideas about practice with inquiry and valuing processes.

An examination of the literature of inquiry indicates that theorists have concluded that the ability to inquire, or to engage in the thinking processes necessary for effective inquiry, must be developed in students through constant practice. Russell (1956) argued that practice in models of inquiry should be given early in children's educational experience. Fenton (1966) maintained that steps in the historical mode of inquiry should be taught and that each skill associated with the model should be practised over and over again. McFarren (1969) advocated constant practice in the use of inquiry models because learning by inquiry is a lengthy and difficult process. Cox (1969) noted that problems with the implementation of inquiry strategies in schools have arisen because the phases of inquiry models and attendant skills have not been practised thoroughly. Branson (1971) claimed that undisciplined thought would not produce sound problem solving abilities and emphasized the need to practise inquiry skills.

The need for practice, in fact, has been one of the main justifications for the development of inquiry models and their use in schools. This aspect of the conceptual framework for the present study is important in terms of the specific problem under investigation. If mastery of basic skills by individuals is necessary for autonomous control of inquiry and valuing processes, and if these processes are to be taught at the elementary school level, then students should have the intellectual capacity to benefit from practice in essential skills such as the generation of alternatives. The study is designed to investigate the extent of this capacity in elementary school children.

Inquiry, Valuing and Elementary School Students

An examination of inquiry and valuing models indicates that a number of them were developed in a secondary school setting. Fenton's (1966) model, for example, was designed for use by secondary students. Oliver and Shaver (1966) developed an extremely sophisticated outline of skills involved in the valuing process. These skills included, among others, abstracting general values from concrete situations; identifying conflicts between value constructs; working towards a general qualified position; and testing the relevance of statements.

The production of models in the secondary context is not an insurmountable problem in terms of applying the models to the elementary level. Appropriate content, for example, can be selected for elementary school students. However, a question arises as to the basic ability of elementary students to cope, not only with aspects of the sophisticated secondary models, but also with the various phases of models designed for the elementary level.

Research has been conducted into various aspects of inquiry. Some of it has been important research, but relatively peripheral to the actual capabilities of elementary school children. For example, Jacobson (1972) developed a content and inquiry model designed to assist in teaching about American Indians. Keller (1973) wrote on the importance of establishing an environment for inquiry. He outlined a procedure labelled the "Complete Lesson" which was felt to provide such an environment. Keller's work incorporated a plea for better implementation of inquiry teaching in the schools.

Blackmon (1973) claimed that teachers were uncertain about inquiry theory and the inquiry process as a whole. He suggested that his study implied a need for high quality inservice training for teachers. Wright (1973) compared three modes of teaching social studies: Problem solving, textbook and multi media. He found that students taught by the problem solving mode improved in social studies achievement as measured by the relevant section of the Sequential Test of Educational Progress. Wright also claimed that the problem solving mode resulted in better student attitudes towards social studies than the other two modes. Massialis and Sprague (1974) outlined an inquiry treatment of social issues, and emphasized the importance of the teacher's role in stimulating inquiry. Crane (1974) noted that inquiry can be based on community resources, and that such a procedure lends relevance to social studies courses.

Other research has impinged more directly upon the actual abilities of elementary school children in connection with inquiry. Robinson (1965) examined the effect of reading skills on problem solving abilities with fourth grade students. The findings indicated that the students needed to use a variety of reading skills when solving problems, and that their abilities in the various skills were uneven. Possien (1965) claimed that elementary students improved in the ability to inquire if they were taught by the inductive method. A conceptual teaching approach resulted in improved inquiry in comparison with methods based on textbooks, according to Carmichael (1965).

Research into the actual capabilities of elementary level students with various aspects of the inquiry process, as outlined in models, has been undertaken also. Suchman (1966) claimed that elementary students' ability to inquire improved after training in the skill of formulating relevant questions. Joyce and Joyce (1966) made similar claims in connection with practice in inferencing. David (1968) found that the ability to generalize was developed best by teaching strategies which emphasized problem solving. Frasier's (1969) research indicated that fourth, fifth and sixth grade students showed improvement in answering questions related to problem analysis and hypothesis formulation after training in a strategy of inquiry. Rapparlie (1969) claimed that first and second grade students, under careful and close guidance, can be taught skills such as observing, comparing, classifying and analyzing. Puglisi (1973) suggested a method of developing hypothesis formulation in connection with inquiry lessons on patriotism. Bernstein (1973) made a philosophic analysis of the skill of observation. Wicks (1973) examined the ability of sixth grade students to ask questions, elucidate facts and produce statements of evidence when stimulated by historical photographs. The findings indicated that the students in the sample could generate questions, facts and statements of evidence, but experienced certain difficulties with each skill. These findings suggested that students at the sixth grade level could benefit from practice in these inquiry skills. However, the research indicated that much practice would be necessary before mastery of the skills, leading to autonomous control of the inquiry process by individual elementary school students, could be achieved.

The research on inquiry skills and abilities suggests, in general, that elementary students can cope, to some degree, with various aspects of the inquiry process, and that they can benefit from training and practice. The present study fits into the framework of this research in as much as it examines the ability of a range of elementary school students to cope with an aspect of inquiry, the generation of alternatives.

Alternatives at the Elementary School Level

There is evidence that dealing with alternatives is one aspect of inquiry which causes difficulty to elementary school students. Clegg and Hills (1968) took three elements of Rath's (1966) values clarification model and examined fifth graders with them, using some of the Taba (1967a) strategies as an instruction vehicle. The values clarification elements were the generation of alternative courses of action, the generation of possible consequences for each alternative and willingness to defend pubicly whichever alternative was chosen: They used two incidents from American history as content. The clash between Roger Williams and the Puritan Theocracy of New England, and the Boston Tea Party. They asked students to generate and discuss alternative courses of action which might have been taken by the various protagonists in the two incidents, then choose and defend one of these alternatives.

Clegg and Hills found that the students tended to generate unrealistic alternatives in the first instance and then had considerable difficulty in choosing with which course of action to identify. This was the case, particularly, with the Boston Tea Party.

A number of factors which might have caused the difficulty impinged upon the study. The Boston Tea Party may have been too far removed from the experience of the students. Further, the number of protagonists in that incident (Sam Adams; Loyalists; Lord North; Governor Hutchinson; the East India Company; Colonial Merchants) made the topic extremely complex. The alternatives suggested for one party, such as the Loyalists, had to be considered in the light of the alternatives (and their consequences) available to other parties. The results suggest that several variables interacting simultaneously might be too much for elementary students to cope with effectively.

The present study examined the generation of alternatives from a perspective somewhat different to that of Clegg and Hills. The problem presented was one to which elementary students could relate. It was a social problem rather than an historical problem. The study incorporated an attempt to gain greater understanding of an aspect of inquiry which has caused problems for elementary school children.

Summary of Section on Inquiry

The section was designed to contribute to the development of a theory framework concerning inquiry for the purposes of this study. The reasons for teaching inquiry and valuing were discussed and the importance of inquiry to social studies as a subject area were noted. Models for inquiry and valuing were examined with a view to demonstrating the importance of alternatives in these processes. The concept of alternatives as indicated in writings of model developers was discussed and the importance of the number of alternatives generated in a problem situation was noted. The value of practice with inquiry skills, such as the generation of alternatives, was reviewed and research in connection with inquiry at the elementary school level was surveyed. A specific problem with alternatives at the elementary stage was noted as the initial stimulus for this study.

CONVERGENT AND DIVERGENT THINKING

The place of this section of the literature review in the general framework of theory for the study can be seen in Figure 3 (p. 30). Research has been conducted in the areas of thinking and intelligence for many years. Carey (1915), after research in this general area, concluded that there existed a number of aspects of intellect in addition to a general factor of intelligence, which he described as a fund of intellective energy and a measure of general ability. Subsequent research has revealed many factors of intellect, including convergent and divergent modes of thinking. Convergent and divergent were identified statistically by Carroll (1941) and brought into prominence by Guilford (1950; 1956; 1959) during his research on the structure of the intellect.

Convergent and divergent thinking were defined, according to Guilford's concept of them, in Chapter 1 (see Definitions). In brief elaboration of those definitions, it can be said that convergent thinking tasks require the thinker to converge upon a uniquely correct answer which can be obtained from information given. Divergent thinking tasks are open ended. The thinker is required to process information with a view to producing a variety of answers, any or all of which may be correct in terms of the stimuli provided.

Three aspects of convergent and divergent thinking appeared to be important for the conceptual framework for this study. These aspects were:

1. The relationship between convergent and divergent thinking.
2. The connections between divergent thinking and creativity.
3. Examples of research conducted with convergent and divergent thinking.

It should be noted that one of the prime purposes of this study was to examine the effects of convergent and divergent thinking upon the generation of alternatives. In view of this purpose, the assessment of convergent and divergent thinking abilities was seen as especially important in the conceptual framework of the study. Essentially, the study is concerned with the application of convergent and divergent thinking abilities, rather than the abilities *per se*.

Relationship Between Convergent and Divergent Thinking

Guilford (1950; 1956; 1959), initially, appeared to regard the two types of thinking as separate factors of intellect which operated independently of each other. Guilford (1950) also saw a connection between divergent thinking abilities and creativity, and felt that they had not been developed sufficiently in the schools. These two facets of Guilford's work during the 1950's provided a basis for subsequent research.

For example, intelligence quotient tests, the traditional measures of intelligence, were reexamined in the light of Guilford's work. Reexamination indicated that the tests were largely convergent in nature. This finding caused questioning of the adequacy of intelligence quotient tests as indicators of intelligence, since they appeared to ignore, for the most part, the divergent thinking/creativity factor suggested by Guilford (1950; 1956; 1959).

Taylor (1961) claimed that the concept of giftedness, or high intelligence, should take into account a creativity rating in addition to the usual intelligence quotient score. In view of the increasing number of factors of intellect which were being isolated at the time, Taylor questioned, logically enough, the rating of intelligence on instruments which seemed to concentrate on only one of those factors. Getzels and Jackson (1962:14) supported Taylor. Their assessment of traditional intelligence quotient tests indicated that the majority of test items incorporated a stimulus which pointed towards an answer which was the only possible correct response. Torrance (1963:183) examined intelligence quotient tests such as the Weschler Intelligence Test for Children, the Otis Quick Scoring Test of Intelligence and the California Test of Mental Maturity. He concluded that some seventy percent of the most creative students were not recognized by these tests. Cropley, in 1965, summarized the general view current at that time. Two separate aspects of intellect were envisaged: Convergent thinking and divergent thinking. The traditional intelligence tests were felt to concentrate on convergent thinking abilities at the expense of divergent thinking capacities. Researchers such as Taylor (1961), Getzels and Jackson (1962) and Torrance (1963) tended to regard divergent thinking ability as an indication of creativity.

The original concept of the two types of thinking as separate factors of intellect which operate independently of each other has been modified. It would appear that both types of thinking are operative when individuals apply thought to various intellectual tasks.

Sultan (1962) conducted research which indicated two of Guilford's creativity-divergent thinking dimensions, flexibility and originality, were not as readily measurable at the grammar school level as among adults. Thorndike (1963) and Marsh (1964) discerned a separate intellectual factor which was measured by divergent thinking tests, but they claimed that convergent thinking had some effect on the divergent scores. Burt (1964) claimed that differences in scores on divergent thinking-creativity type tests resulted from differences in general ability, by which he meant the traditional concept of intelligence, rather than differences in an entirely separate intellectual capacity called creativity. Vernon (1964) supported Burt, suggesting that a more adequate measure of intelligence could be achieved by adding some divergent sub-tests to the ordinary type of intelligence test.

Cropley (1965; 1966), after examining convergent and divergent thinking tests, found that convergent and divergent thinking were not completely independent of each other. Significant correlations between divergent thinking results and results from conventional intelligence tests were reported by Williams (1966). Moss and Duenk (1967), in a study of Torrance's Tests of Creative Thinking (1966), claimed that some convergent thinking abilities influenced creative output.

Nevertheless, a sampling of recent research indicates that the two types of thinking can be distinguished, though some correlation exists between them. Although Cropley (1965; 1966) found that convergent and divergent thinking were related to some degree, he felt that the correlation was relatively small and that the two types of thinking could be distinguished. Cropley (1967a) also felt that research results permitted, on the whole, the view that an intellectual dimension called creativity had been established, and that creativity-divergent thinking tests measured something neglected by the traditional measures of intelligence. Similar views were expressed by Ward (1968), who noted that divergent thinking ability can be distinguished from abilities represented by intelligence quotient scores. He pointed out, however, that situational variables, such as the testing environment had to be taken into account. The Wallach-Kogan (1965) tests of creativity were examined by Cropley and Maslany (1969). They found that this instrument measured a stable and internally consistent intellectual mode which was, nevertheless, related to general intelligence as measured by intelligence quotient tests. Convergent and divergent thinking abilities were found to be amenable to separate measurement by Lytton and Cotton (1969), but they noted that the two types of thinking were complementary aspects of intellectual functioning.

Perhaps the most reasonable concept of these types of thought has been presented by Cropley (1969). He suggested that convergent and divergent thinking are ways, or styles, in which intelligence is brought to bear upon the environment. By intelligence, Cropley meant a generalized source of intellectual ability. He indicated Galton's (1883) concept of "general ability," Spearman's (1904) idea of "general mental energy" and Burt's (1962) "innate general cognitive ability" as examples. The two types of thinking seem best conceived of as styles, or modes, of thought. The point remains, however, that any individual will exhibit some ability in both styles.

The important points for this study are that a convergence/

divergence distinction has been established and that categorization of students according to this distinction is possible. Completely convergent or divergent individuals cannot be identified. Rather, individuals with biases towards either convergence or divergence were identified in this study. In addition, individuals who exhibited strong and weak performances in both dimensions emerged. The types of students which the study investigated can be described as convergers (High-Low), divergers (Low-High) and all-rounders (High-High; Low-Low) as in Hudson (1966:55).

Divergent Thinking and Creativity

A number of scholars have viewed divergent thinking as an indication of creative potential. Taylor (1961), Getzels and Jackson (1962), Mednick (1962), Torrance (1966) and Wallach and Kogan (1965) developed instruments for measuring divergent thinking ability, which were called creativity tests. Controversy continues as to whether or not these tests really measure creativity.

No generally acceptable definition of creativity has yet emerged from research. Maslow (1959) defined creativity in terms of experience, outlining some eighteen experiences which he associated with the creative act. These experiences included seeing formerly hidden truths, loss of self-consciousness and aesthetic perceptions. Mednick (1962) explained thinking as a chain of associated ideas. He defined the creative act as "the forming of associated elements into new combinations which are useful in some specific way." The Mednick concept of creativity is based on an associationist point of view concerning the creative process which Mednick and Mednick (1964) outlined as follows:

> Creative thinking consists of new combinations of associative elements, which combinations either meet specified requirements or are in some way useful . . . The more mutually remote the elements of the new combination, the more creative is the process or solution. (p. 55)

Other definitions of creativity have been based on the creative product as distinct from the creative process. For example, Flanagan (1963) felt that the creative product should be clever as well as satisfactory. Jackson and Messick (1963) held that a creative product should meet four criteria: Appropriateness (i.e. not absurd); unusualness (i.e. infrequent); transformation (i.e. something new and overcoming conventional restraints); and condensation (i.e. display a simplification of complexity).

Further views on creativity have included a Gestalt concept (Wertheimer, 1954), an environmentalist explanation (Weisberg and Springer, 1967) and a psychoanalytic perspective reported by Dacey and Madaus (1969). O'Bryan and MacArthur (1969) outlined what seems to be a widely accepted view of creativity. They noted that the nature of creativity incorporates "a complex pattern of abilities in which fluency, flexibility, elaboration and redefinition of ideas combine with sensitivity to problems so that an unusual or original solution to a problem is produced." O'Bryan and MacArthur (1969) pointed out that although theoretical positions on, and interpretations of, creativity varied, many included the element of redefinition of ideas. They noted that divergent thinking (Guilford, 1950), combinatorial play (Mednick, 1962) and redefinition of hypotheses (Torrance, 1966) were examples of redefinition of ideas.

It would appear that divergent thinking can be regarded as a facet, at least, of creativity. However, the many different viewpoints concerning the nature of creativity seem to indicate that equating divergent thinking with creativity could be misleading. Creativity seems to be a much more complex phenomenon than divergent thinking. At the same time, it seems reasonable, in the light of available research, to regard divergent thinking as a component of creativity.

Research Connected with Convergent and Divergent Thinking

The research discussed so far has been concerned largely with the identification of convergent and divergent thinking abilities and connections between divergent thinking and creativity. Other studies on various aspects of the two types of thinking fill out the conceptual framework for the study.

The importance of divergent thinking as a possible index of creativity has led to research into ways of developing it in elementary students. Klausmeier and Teel (1964), Covington and others (1966) and Wardrop and others (1969) developed instructional strategies designed specifically to strengthen divergent thinking ability. Wodtke and Wallen (1965) and Torrance (1965) found that teacher and peer evaluation of work stifled creativity, while self evaluation encouraged it. Crabtree (1967) reported that teacher-pupil cooperation in planning was more effective in producing divergence of thought than teacher-dominated strategies. White and Owen (1970) supported the findings of Wodtke and Wallen (1965) and Torrance (1965) in connection with the encouragement of creativity through self evaluation. Payne (1973) claimed that divergent thinking, as an aspect of creativity, can be encouraged by appropriate treatment regimes.

Relationships between the two types of thinking and various other variables have been studied. Klausmeier and Wiersma (1964) found that girls scored lower than boys on convergent thinking tests, but higher than boys on measures of divergent thinking. Cline and others (1962) and Wade (1968) examined the relationship of academic achievement to convergent and divergent thinking abilities. In general, their results indicated that neither style of thinking predicted academic achievement better than the other. Dilcher (1971) examined convergent and divergent thinking in relation to attitudes and achievement in biology courses. Strum (1971) investigated the relationship between creativity and academic risk taking among fifth graders. Bal (1972) claimed that Mednick's Remote Associates Test (R.A.T.) was unable to identify creative potential in college freshmen.

Some research has been conducted on convergent and divergent thinking as they relate to inquiry. The present study fits into this aspect of research. Haddon and Lytton (1968) claimed that discovery-type strategies developed a high level of divergent thinking ability. Covington (1968) conducted research which indicated that activity with problems involving the generation of consequences from actions would help to develop divergent thinking or creative abilities. Belsky's (1971) study indicated that inquiry strategies enhance subsequent divergent thinking ability, while expository teaching techniques retard it. Van Scooter (1971) developed and analysed an inquiry test for social studies. He found that convergent and divergent thinking factors merged into a higher order factor which he labelled Intuitive Thinking.

The specific starting point for this study was an investigation by Wicks (1973). In that study Wicks categorized sixth grade students according to their convergent and divergent thinking abilities in the manner indicated in Chapter 1. The students' performances on recognition of facts, asking questions and giving statements of evidence was examined. No significant differences were found among the High-High, High-Low and Low-High categories. The Low-Low category appeared to be significantly lower in performance than the other three. The present study examined a different facet of inquiry and, additionally surveyed performance from the perspective of the cognitive and moral development models of Piaget and Kohlberg.

Summary of Section on Convergent and Divergent Thinking

The section was intended to assist in developing a theory and conceptual framework in connection with convergent and divergent thinking. Relationships between the two types of thinking were discussed with a view to indicating that they could be distinguished from each other, although they do not appear to be fundamental and separate aspects of intellect. Divergent thinking was examined in relation to creativity. The examination indicated that divergent thinking might not be synonymous with creativity. Research connected with convergent and divergent thinking was surveyed, and the place of the present study in relation to the research was outlined.

DEVELOPMENT MODELS

Because the alternatives instrument (Spray Paint, Moore and Woodruff, 1969) impinged upon values and morals in addition to inquiry, the study provided an opportunity to examine students' responses from the perspectives of Piaget's (1952) cognitive development model, and Kohlberg's (1966) moral development model. The purpose of this section is to outline the place in the study of these development models. It should be noted that the study did not attempt to explore the work of Piaget and Kohlberg. In general, the developmental constraints suggested by their models provided perspectives from which the results of the study could be viewed (See Figure 2).

Cognitive

Piaget and Inhelder (1969) have outlined Piaget's development model. It is made up of a series of stages identified with approximate ages. The main outlines of the model can be expressed as levels of mental growth as follows:

1. Sensori-motor level (Birth to 1 1/2-2 years).
2. Preoperational level (About 2 years to 7-8 years).
3. Concrete operational level (About 7-8 years to 11-12 years).
4. Formal operational level (About 11-12 years to 14-15 years).

According to Piaget and Inhelder (1969), an individual at the cognitive level of concrete operations can relate to classes (objects and groups of objects) and relations between objects. Children at this level can manage the function of reversibility which allows the development of the ability to conserve. Reversibility and conservation permit the retention of at least two variables in the mind as thought focusses on categories or classes.

The students who participated in the study were largely in the age range covered by Piaget's concrete operational level. One purpose of the study was to report on the performance of such children at generating alternatives. Piaget's model provided a framework in which the performances of students at various age levels could be noted.

Moral

Piaget (1932) claimed that moral attitudes, as well as cognitive capabilities, developed sequentially in children. Kohlberg (1963; 1964; 1966) developed a six stage model for moral development. Kohlberg's model is shown below.

Level I - Preconventional.
  Stage 1. Punishment and obedience orientation.
  Stage 2. Opportunistic reciprocity. The right action is that which satisfies the individual's needs.

Level II - Conventional.
  Stage 3. Good boy orientation towards approval and pleasing others.
  Stage 4. Law and order. Social-order-maintaining orientation.

Level III - Postconventional.
  Stage 5. Contractual legalistic orientation. Duty defined in terms of contract. Avoidance of violation of the rights of others.
  Stage 6. Conscience or principle orientation. Orientation to conscience as a directing agent, and to mutual respect and trust. (Kohlberg, 1966)

Kohlberg applied only very approximate ages to the various levels of his model. It would appear that Stage 6, for example, might be beyond the development of many adults. Kohlberg (1973) noted that children of about ten years of age can be at Stage 1 and at Stage 2 when they reach thirteen years of age. Kohlberg (1973) quoted the case of a nineteen year old who had reached Stage 4. An attempt was made to categorize responses in terms of the early stages of Kohlberg's model.

GENERAL SUMMARY

In this chapter, the importance of inquiry and valuing in the milieu of social studies was discussed. The generation of alternatives was established as an essential phase of inquiry and valuing. A framework of theory for convergent and divergent production was developed, and the place of Piaget's and Kohlberg's models in relation to the study was outlined.

Chapter 3 will be devoted to discussion of methods for assessing convergent and divergent thinking abilities; to reporting the instruments selected for use in the study; outlining the procedures employed with the pilot study; and describing the sample and the conduct of the main study.

CHAPTER 3

CONDUCT OF THE STUDY

INTRODUCTION

This chapter includes discussion of the instrumentation, a report on the pilot study, a description of the sample used in the main study and an outline of the conduct of the main study.

INSTRUMENTATION

The purpose of this section of the chapter is to indicate the reasons for selecting the specific instruments used in this study. Three instruments were employed. One instrument incorporated the social problem solving situation to which students were asked to react by generating alternatives. The other two were used to assess convergent and divergent thinking abilities respectively.

Generation of Alternatives Instrument: Film Loop Spray Paint

The function of this instrument was to provide a social studies problem situation to stimulate the generation of alternatives. Partly in view of the problems encountered by Clegg and Hills (1968), and partly to enable the results to be examined from Kohlberg's (1966) moral development perspective, it was felt that the situation depicted in the instrument should meet the following criteria:

1. It should provide scope for the generation of alternatives.
2. It should be simple enough to allow a wide range of elementary students to react to it.

3. It should be concerned with a social problem.

4. It should be a situation to which students could relate personally, rather than a somewhat impersonal historical incident, for example.

5. It should provide scope for the students to indicate their individual attitudes to the incident.

6. It should involve a relatively brief administration time in order to allow a large number of students to participate.

Pictorial material was examined with a view to finding a suitable instrument for use as a stimulus for the generation of alternatives. A wealth of print and pictorial material pertinent to social studies was available, but much of it was not suitable for the needs of the study.

Some of the material examined was of an informative nature. The Visual Teaching Series (Ed., R. E. Fideler, 1965) was an example. This series contained pictures of various parts of the world, such as the Caribbean lands. The pictures illustrated many facets of Caribbean life, for example, but did not focus on a specific social problem to which elementary students might relate meaningfully. Picture Story Study Print Sets (Society for Visual Education, 1966) was another example of an informative collection of pictures, "Children of Africa" being a representative title from the set.

Material which focussed on social relationships of various kinds was investigated. The About Myself Series (Bowman Publishing Corporation, 1968) was an example. This series concentrated on social relationships. "Other People Around Me" was a segment of this series which was concerned with the relationships of the child to persons outside the family. The series was not designed to examine social problems, and none of the pictures depicted a social problem, though they were very suitable for discussion of acceptable social behavior. Investigating Man's World (Paul R. Hanna, 1970) incorporated a number of pictures which touched upon aspects of social life such as change, homes and families. However, no specific social problem was outlined in the pictures. A Portfolio of Photographs (Copp Clark Publishing Company, n.d.a.) provided some excellent photographs about topics such as children fighting and rescue work. These pictures showed great potential for use in development of discussion skills, but did not provide a clear cut example of a social problem.

Another example of the pictorial material available was provided by One World: Discussion Picture Programme for Elementary Social Studies (Edward E. Owen, 1971). The section of this series entitled "The Family" compared various human and animal families with a view to developing concepts of intra-family relationships. This approach, however, did not provide for direct treatment of social problems.

The Story Telling Posters Series (Developmental Learning Materials, 1971) contained material which was closer to the study's needs. The series contained pictures of poorer city areas and their inhabitants. However, the pictures did not portray incidents or action.

The pictorial material which came closest to meeting the requirements of the study was Discussion Pictures for Beginning Social Studies (R. Muessig, 1967). This material could be used to develop critical thinking and problem solving skills as outlined in the accompanying Teacher's Guide (p. 20). The pictures themselves did not depict social problems directly. The study called for a stimulus which was direct and apparent immediately.

The pictorial material, in general, failed to meet the criterion that the instrument for the study should depict a social problem. Failure to discover suitable pictorial material caused the investigator to examine films, where the search was more successful.

A series of film loops by Moore and Woodruff (1969) seemed to meet the criteria mentioned above. The series contained eight film loops each of which focussed on a social problem such as vandalism, shoplifting or bullying. The films were designed to assist in the teaching of a values clarification process. Their content impinged upon moral development. Both the type of problem and the context for use appeared to be suitable for the study.

Eight film loops were examined and Spray Paint (Moore and Woodruff, 1969), which involved vandalism, was selected. The action in this loop, as in the others in the series, was divided into two phases. The first phase showed the act of vandalism being committed. The second phase suggested several courses of action which might be taken by an individual when confronted with others who are committing vandalism. The loop ended by asking the viewer to decide upon a personal course of action. The second part of the loop was not needed for the study. The first part appeared to be suitable and was selected for use in the study.

In the first part of Spray Paint (Moore and Woodruff, 1969), two boys of elementary school age (approximately eleven years old) were shown in the process of committing an act of vandalism. The boys discovered cans of spray paint amongst some garbage and proceeded to deface a clean, white building wall. When the wall was thoroughly defaced, another boy, who appeared to be of an age similar to the others, was brought into the action as a spectator. He took in the scene. The others acknowledged his presence. The spectator gave no sign of what he might do in the face of the problem situation with which he had been confronted.

The loop went on to indicate and explore possible courses of action which the spectator might take. In this study the loop was stopped at the point where the spectator arrived on the scene and absorbed the situation.

The incident was clearly delineated, colour photography had been employed, and the relevant section of the loop lasted about a minute and a half. The film was silent, and this factor was felt to be advantageous, as it eliminated possible problems connected with language, or sound technology, and allowed full concentration upon the incident.

The loop was subjected to a reliability treatment (Pearson

Product Moment, test re-test) on the number of alternative courses of action, which elementary students might generate in response to it. Reliability coefficients of .77 for number of alternatives and .69 for number of consequences were obtained.

Convergent Thinking Instrument: Progressive Matrices

The problem for this study was to select an instrument which was highly convergent in nature, preferably largely free of verbal factors, and which was suitable for use with a range of elementary school children.

Intelligence quotient tests have been used extensively as measures of convergent thinking. Getzels and Jackson (1962; 1963) relied on the Stanford-Binet and Henmon-Nelson Tests. Torrance (1963) employed the Metropolitan Test of Readiness. Cropley (1965; 1966; 1967; 1968) used the Lorge Thorndike battery of tests. The Scholastic Aptitude test was used as a measure of convergent thinking ability by Dowd (1966).

The use of conventional intelligence quotient tests as measures of convergent thinking is logical enough. These tests consist mainly of questions or puzzles which are based upon the principle of having only one unequivocally correct answer to each item. The subject is required to find the one right answer to each problem. The subject's reasoning is said to converge upon the one and only correct solution.

Thurstone's (1962) Primary Mental Abilities test battery provided an example of the convergent nature of conventional intelligence quotient tests. Some examples from its various subtests include:

Gift . . . . A. Cart B. Corner C. Trick D. Present

6, 7, 8, ___, 10, 11. A. 12 B. 9 C. 8 D. 10

June is wrapping 12 Christmas presents. She needs 2 feet of ribbon for each. How many yards must June buy?

Which one is different? A. Low B. Dog C. Cat D. Hat.

There are also diagrammatic exercises concerned with verbal meaning (pictures), reasoning (figure grouping and word grouping) and perceptual speed.

However, there are some problems connected with the use of intelligence quotient tests as measures of convergent thinking ability. While most of the items seem convergent in nature, it is possible to note items which do not appear to be convergent. For example, Nisbett (1972) pointed out that the Canadian Lorge Thorndike (1954-67) test contained items pertaining to general knowledge. Such items are not necessarily convergent in nature.

Many tests are of an omnibus type in that they seem to have multi-purposes and formats. Rosenbach (1972) noted this point in connection with the California Test of Mental Maturity (1963 Revision). He mentioned its affinity with Stanford-Binet scores and Weschler scales. Many tests tend to incorporate language, number and visual formats. Explicit information about the degree of convergency in these various formats is rarely available.

Another problem concerns the verbal nature of some sections of intelligence tests. Reading ability would appear to be a factor in success or failure on these tests. Further, some intelligence tests are not suitable for use with younger elementary children.

Some tasks apart from intelligence tests have been designed to measure convergent thinking ability. A selection of these was compiled by French (1963). Klausmeier and Wiersma (1964) used current events, work study skills and analogies as bases for convergent thinking tests. Cropley (1966) mentioned a vocabulary test, a test on inferences and a length estimation test as measures of convergent thinking. Some of these were taken from the collection compiled by French (1963). Wober (1970) presented subjects with a number of sets of scattered letters from which answers such as a boy's name or a flower had to be obtained. Each item was devised on the principle of having only one possible correct answer to each task. Guilford and Hoepfner (1972) outlined a number of tests which were designed with the convergent factor specifically in mind.

There were problems with these tests also. Many of them were designed for, and used with, students older than the age range proposed for the study. Some of the tests used by Cropley (1966), for example, were suitable only for high school students, as was the test used by Wober (1970). Of forty three factor analytic studies executed between 1950 and 1969 by Guilford and his associates, only one refers specifically to sixth grade students.

An instrument which appeared to meet the needs of the study was Raven's Progressive Matrices (1956; 1962). The matrices are a series of patterns each of which has a piece missing. The subject is invited to select the missing piece from a number of pieces depicted under each pattern. Raven claimed that the instrument could be administered either to individuals or groups, that it was suitable for children in the elementary school age range and that it differentiated between genuine intellectual superiority and verbal fluency.

Extensive research has been conducted in connection with Raven's (1956; 1962) Progressive Matrices. Some of the findings which appear to be pertinent for this study are reported here. Bolin (1955) noted that the Progressive Matrices test measured best the non-linguistic areas of intelligence. The test can be administered in either board or book format, and Jordan (1959) conducted research which indicated that results from both versions are comparable. Elley and MacArthur (1962) noted that the Progressive Matrices correlated less than a language ability measure with socio-economic status; had a high loading on a general intellectual ability factor; and had an internal consistency reliability of .87.

The book form of the Progressive Matrices has been produced in two versions: The Standard and the Colored. The Colored Progressive Matrices are for use with younger children. Freyburg (1966) noted that the Colored Progressive Matrices had coefficients of internal consistency and stability of .89 and .87 to .86 respectively. In a study of convergent and divergent abilities in children, Biggs, Fitzgerald and Atkinson (1971) conducted a factor analysis on the

Standard Progressive Matrices. The factor analysis indicated an orthogonal convergence factor reading of .809 for the Standard Progressive Matrices and an orthogonal divergence reading of .147. Kennedy (1972) found no sex differences in results on the Progressive Matrices test.

The Progressive Matrices appeared to meet the needs of the study. It was relatively free of language difficulties; it had been found to be highly reliable; it did not appear to be unduly affected by socio-economic status; sex did not seem to affect its results; it could be administered to individuals or groups; it had versions suitable for both younger and older elementary groups; and it was highly convergent in nature. These factors were strongly persuasive towards using the Progressive Matrices as an instrument to assess convergent thinking ability for the purposes of this study.

Divergent Thinking Instrument: Wallach and Kogan Tests of Creativity

The needs of the study called for a set of tasks which exhibited relatively high correlations with each other and, at the same time, relatively low correlations with measures of convergent thinking.

A great variety of divergent thinking tests, often labelled creativity tests are available. Guilford (1959) noted that such tests depended on setting tasks which required the production of a variety of responses, and in which the product was not completely determined by the given information. The essential characteristic of these tests is their open endedness. Typical examples from divergent thinking tests are:

How many uses can you think of for a brick (tin can, paper clip)?

In how many ways can a pencil (various toys) be improved?

How many meanings can you give for each of these words in the following list?

A basic idea behind such tests is to "challenge the inventiveness of children" (Torrance, 1963:174). In these tests, the subject is given the chance to diverge, to think tangentially without exploring any particular line of detail.

Getzels and Jackson (1962; 1963) used word association tests and unusual uses tests. In word association tests, the subject is asked to generate a number of different meanings for each word in a list. Unusual uses tests require the subject to list as many uses as possible for various common objects. Tests based on making up problems, on hidden shapes and on tables were also used by Getzels and Jackson (1962; 1963).

Tests based on plot titles, questions about plots, object improvement, sentence improvement, uses for objects and uses for words were employed by Klausmeier and Wiersma (1964). Word uses, uses for bricks, improvements to a pencil, plot questions and making up titles were used by Feldhusen and Denny (1965) as the bases for divergent thinking tests. Cropley (1965; 1966; 1967b) used batteries of divergent thinking tests. These included tasks involving the identification of problems, consequences, symbol production and uses for tin cans, in addition to tests based on hidden figures and associations. Cropley worked with similar tests as recently as 1972.

Word meaning, anagrams, plot titles and unusual uses were included in the divergent thinking tests employed by Dowd (1965). Subjects were asked to elaborate articles, make meaningful statements and work with apparatus by Hutchinson (1967). Debney (1969) and Wober (1970) worked with word association tests.

Scoring of Divergent Thinking Tests. Over the years, a common practice has involved the administration of a number of divergent thinking tests, or an instrument made up of various sub-tasks, and scoring them for one or more of certain dimensions of divergent thinking ability which have been recognized. These dimensions are: Fluency, flexibility, elaboration and originality. Fluency is the actual number of responses. Flexibility involves changing from one category of response to another. The number of changes is scored in this case. Elaboration is scored by counting the number of details added to a stimulus shape or figure. Originality is the ability to make unusual responses. Scoring for originality is done by tabulation of answers from a group in order to find the least common responses and weighting them more heavily than the others. Among the most prominent batteries of divergent thinking tests are those of Guilford (1956), Getzels and Jackson (1962), Mednick (1962), Wallach and Kogan (1965) and Torrance (1966). All of them involve the use of one or more of these methods of scoring.

Scoring procedure has often taken the form of scoring divergent thinking instruments for some of these dimensions and summing the scores to obtain a total divergent thinking or creativity score. This procedure was questioned by Eastwood (1965) on grounds that the various dimensions might not represent the same entity. If they did not, then scores from the different dimensions would not be additive. There is some evidence that the dimensions might not be additive. For example, Wallach and Kogan (1965) examined research on divergent thinking tests used by Getzels and Jackson (1962) and noted that correlations among these tests were low. An examination of tests used by Torrance indicated an independence between verbal and visual types of divergent thinking instruments (Wallach and Kogan, 1965).

Tests scored for fluency and originality appear to be more reliable than tests scored for other dimensions of divergent thinking (Getzels and Jackson, 1962; Torrance, 1963; Mackler, 1966; Grover, 1966; Dacey and Madaus, 1969). This situation has caused researchers such as Cropley (1966; 1967; 1969) to score divergent thinking tests for originality alone in order to avoid the assumption that the various dimensions represent a similar entity.

Validity and Reliability of Divergent Thinking Tests. There are problems with the validity and reliability of all divergent thinking tests. The relationship between the two types of thinking, discussed in Chapter 2, is one indication of the validity problem. Another problem with validity is incorporated in the question of whether or not these tests are measures of creativity (Chapter 2). The validity of the tests has been questioned by many. Vernon (1964) was dissatisfied with the validity of divergent thinking tests. Harvey and others (1970) found Torrance's tests of creativity suspect with regard to validity.

However, Debney (1969) suggested that word association tests had a high level of significance for creativity, and that creativity/divergent thinking tests measured what they claimed to measure. Debney (1969) noted that the lack of full validity as yet probably resulted from the absence of established criteria for creativity and made the point that no standardization has been achieved. Cropley (1972) conducted a longitudinal study of creativity tests. He judged that they had a reasonable long range predictive validity, especially if scored for originality. This result supported claims by Torrance (1970).

The reliability problem was illustrated in the previous section during the discussion on scoring the tests. Researchers such as Wodtke (1964) have noted the generally inconsistent reliability of these instruments. Cropley (1969) acknowledged it when he suggested scoring these tests for originality alone. The problem was given practical expression by Cullina (1971). Working in the subject area of art instruction, Cullina noted high correlations between fluency and flexibility scores; moderate correlations among originality, fluency and flexibility; but low correlations between fluency, flexibility, originality and the other well recognized dimension, elaboration.

In general, the problems of reliability are concerned with the inconsistency of results from the various dimensions; inconsistent correlations among the various tests in a given battery; and often fairly high correlations with conventional intelligence quotient, or other convergent thinking, tests. The variety of tests available, and the conflicting and indecisive reports about them, present continuing difficulties in selecting divergent thinking instruments.

Choice of a Divergent Thinking Instrument for the Study. The Wallach and Kogan (1965) tests appeared to meet the needs of the study. These tests, along with those of Guilford (1956), Getzels and Jackson (1962), Mednick (1962) and Torrance (1966), are among the best known batteries of divergent thinking tests which have been developed.

Wallach (1970), having examined all these batteries, discerned two groups among them. He claimed that the tests of Guilford, Getzels and Jackson, and Torrance were very similar to each other. Those of Mednick and Wallach and Kogan were alike, but both differed from the Guilford group.

Taking Torrance as an example of his group, it can be argued that these batteries were based on a certain concept of creativity. Torrance (1965) defined creativity as "a process of sensing difficulties, problems, gaps in information, missing elements; making guesses . . . about these deficiencies . . ." (p. 8). Guilford and Getzels and Jackson agree, in the main, with this concept.

Wallach and Kogan's battery was based on quite a different concept of creativity, the associative concept developed by Mednick

(1962). Mednick's concept of creative thinking involved ". . . the forming of associative elements into new combinations . . ." (p. 221).

Crockenberg (1972) examined both the Torrance, and Wallach and Kogan batteries. The findings in connection with the Torrance tests indicated that elaboration scores appeared to measure something distinctly different from flexibility, fluency and originality. This point made suspect the inclusion of elaboration scores in an additive total. Further, Crockenberg claimed that scores on the Torrance tests correlated more highly with lower intelligence quotient scores: .88 with I.Q.'s below 90; .69 with I.Q.'s 90-110; -.30 with I.Q.'s 110-130. (See also Yamamoto, 1964; 1965.) These results appeared to indicate that the Torrance tests, and others based on the same principles, might be more useful with students in the higher intelligence quotient ranges. The needs of the present study called for an instrument suitable for use with a wide range of intelligence quotients.

With regard to the Wallach and Kogan battery, Crockenberg noted that the various sub-tests yielded fairly high correlations among themselves, indicating that the battery measured a reasonably consistent phenomenon. The sub-tests also yielded reasonably low correlations with intelligence quotients. Crockenberg's findings on this point were supported by Ward (1968). Two groups were examined by Ward. One group had an intelligence quotient range of 97 to 142 ($\overline{X} = 115.5$). The other group's intelligence quotient range was 63 to 138 ($\overline{X} = 102.9$). In the first group, correlations of intelligence quotient with the Wallach-Kogan tests ranged from -.03 to -.17. With the other group, the correlations were significantly negative.

The Wallach-Kogan battery appears to measure a reasonably consistent phenomenon which is fairly independent of intelligence tests, which are claimed to be largely convergent in nature. It would appear to be possible to obtain a high score on the Wallach-Kogan test and a low one on a convergent thinking task. Moreover the Wallach-Kogan instrument appeared to provide more consistent results over a wider range of intelligence quotients than the Torrance tests. It had the advantage, in the case of the present study, of having been developed with elementary (fifth grade) students. Wallach and Kogan reported reliability coefficients (Spearman-Brown Split-Half) of higher than .82 for eight out of ten variables in connection with their instrument. This instrument was selected for use in the study.

Summary of Instrumentation

The film loop Spray Paint (Moore and Woodruff, 1969) was selected as the stimulus for the generation of alternatives because, basically, it provided a realistic portrayal of a social problem to which elementary children could relate. Raven's (1956; 1962) Progressive Matrices was chosen as the convergent instrument because its highly convergent nature had been established statistically. The selection of Wallach and Kogan's divergent instrument was based largely on its relative reliability and validity when compared to similar tasks, and its suitability for elementary school children. Fluency and originality appeared to be the most reliable dimensions of divergent thinking for which to score.

THE PILOT STUDY

The purposes of the pilot study can be listed as follows:

1. To try out the instruments with a range of elementary school students in order to verify that such students could react satisfactorily to the tasks.

2. To provide experience for the investigator in administering the instruments.

3. To provide experience for the investigator in scoring the instruments.

4. To investigate whether or not students could be categorized according to the results of the convergent and divergent thinking instruments.

5. To provide experience for judges other than the investigator in handling students' responses to the divergent instrument. These judges participated in the main study.

6. To obtain ratings of inter-judge agreement on students' responses.

7. To investigate methods of recording students' responses.

The pilot was carried out during October-November, 1973. Students aged six years, nine years and eleven years participated in the pilot investigation. Fourteen six year old students, fifteen nine year olds, and five eleven year old students were involved. The students lived, and attended school, in a lower socio-economic status urban area.

The Alternatives Instrument

Since specific instructions for the use of the film loop in an investigative context were not available, one purpose in piloting the instrument was to develop a satisfactory procedure for administration. The following general plan appeared to be successful.

1. Viewing the loop by each student.
2. Indication by the student that the incident was understood.
3. Generation of alternatives by the student.
4. Expression of an attitude towards the incident by the student.

Operationally, the film loop was shown to each student individually by the investigator. When it was stopped, the student was asked to tell, briefly, what had happened in the film. The investigator then suggested to the student that the spectator in the film loop faced the problem of deciding what to do, having seen the other two boys defacing the wall. The student was asked to generate as many alternative courses of action as possible. Each student was told that the investigator would accept all suggestions made and that the procedure would stop when the student indicated that no further suggestions were forthcoming.

Actual use of the film loop indicated that scope was provided for the generation of a second set of alternatives, namely, consequences of the courses of action already suggested. Therefore, after the students' original suggestions as to courses of action had been noted, the student was referred back to each suggested alternative course of action and was asked to generate consequences to it.

When suggestions as to consequences were completed, each student was asked to nominate a course of action he or she would take in the situation depicted in the film, and offer a reason for the choice.

The actual procedure followed the outline provided below:

After introductory conversation aimed at setting the student at ease, the investigator opened the proceedings.

Investigator: We are going to watch a short film. There are three boys in the film. I want you to watch what they are doing. When the film is over we will talk about what happened.

Film Loop Shown.

Investigator: Now that you have seen the film, tell me what happened in it.

Student: Offered a description of what happened in the film.

Investigator: That was well done. Now, there is usually a problem when someone like the boy in the red jacket [spectator] finds people behaving like those two boys. The problem for the boy in the red jacket is to decide what to do. I would like you to tell me all the things that he might do in this situation. Remember, tell me all the kinds of things that he might do. I will write down everything you say until you want to stop.

Student: Suggested courses of action which were recorded by the investigator. The student indicated when no further suggestions would be made.

Investigator: Thank you. Now, let us go back to your first suggestion. [Investigator read the suggestion aloud.] Let us suppose the boy did that. Tell me all the things that might happen then.

Student: Suggested consequences and indicated when no further suggestions would be made. Investigator recorded.

Investigator: Thank you. Now, let us go on to your second suggestion. [Investigator read the suggestion aloud.] Let us suppose the boy did that. Tell me all the things that might happen then.

Procedure continued until all alternate courses of action had been covered.

Investigator: You have told me some of the things that the boy might do, and you have told me, also, what might happen if he did those things. Now, I would like you to tell me what you would do if you were like the boy in the red jacket and found two boys like those in the film, defacing a wall.

Student: Indicated a course of action. Investigator recorded.

Investigator: Why?

Student: Indicated a reason for adopting the course of action. Investigator recorded.

Each student's responses were written down by the investigator. This recording procedure was adopted because it relieved the students of problems connected with written composition, handwriting and spelling. The procedure also avoided problems stemming from strangeness or uncertainty which might have occurred with the use of recording machinery.

All students indicated that they could react to the film loop in terms of generating alternative courses of action and alternative consequences to those courses of action. Performance on generation of alternative courses of action and their consequences is reported in Table 1 (page 88). The relatively high $\overline{Y}$ produced by the eleven year students was caused by one student who generated what appeared to be

Table 1

Mean Number of Alternatives (Courses of Action and Consequences) Generated from "Spray Paint" (Pilot Study)

Age	N	$\bar{X}$ Courses of Action	$\bar{Y}$ Consequences
6	14	3.07	5.14
9	15	5.41	15.18
11	5	8.80	43.20

an abnormally large number of consequences.

The responses of the six year old students were examined particularly closely because they were the youngest in age range of students who participated in the pilot. It was felt that they did not produce sufficient responses, relative to the other age levels, to provide security for an adequate supply in the main study. A change from six year old to seven year old students was decided upon for the main study.

The investigator found that the students were interested in the film. Every effort was made to create a relaxed atmosphere and the investigator attempted deliberately to establish rapport with each student. It was felt that a reasonable degree of student cooperation was achieved, as evidenced by the students' willingness to respond to the stimulus of the film loop.

The Convergent Instrument

Raven's Progressive Matrices (1956; 1962), Colored Version, was administered according to the manual's instructions to the three age levels. The Progressive Matrices can be administered either to individuals or to groups. The investigator administered it individually in an attempt to achieve as accurate a result as possible.

The Progressive Matrices book was given to each student. The investigator was provided with a score sheet. The student examined each task in the matrices and pointed out the piece when he chose to complete the pattern. The investigator recorded the scores. Raven's instructions were followed throughout. Raw scores were used as indicators of convergent thinking ability.

No problems occurred with the administration or recording of the students' scores. However, it was felt that eleven year old students might find the Colored Matrices too easy, and the Standard Version was used for the eleven year olds in the main study.

The Divergent Instrument

The Wallach-Kogan divergent thinking instrument is made up of five techniques, each of which contains a number of items. Three of the techniques are verbal and two are visual. The verbal techniques are Instances, Alternate Uses and Similarities. The visual techniques are Pattern Meanings and Line Meanings. The techniques and their items are set out in Appendix 1. In brief, there are four items in Instances, eight in Alternate Uses, ten in Similarities, eight in Pattern Meanings and nine in Line Meanings, making thirty nine items in all.

The instrument was administered according to the general instructions of Wallach and Kogan. The main features of these instructions included the establishment of a game or play context with the students; the administration of the instrument to individual students; and the recording of the students' responses by the investigator. Each student was encouraged to provide as many responses as possible. The students indicated when they had finished with each item. Wallach and Kogan's specific instructions for each technique were followed and are shown in Appendix B. Cards (6" x 4") containing the visual materials were used with the techniques of Pattern Meanings and Line Meanings. Diagrams of the cards have been provided in Appendix B. The tasks were administered in the order suggested by Wallach and Kogan (1965, p. 28): Instances, Pattern Meanings, Alternate Uses, Similarities and Line Meanings.

The procedure for each technique with each student commenced with a short period devoted to getting acquainted and establishing the points that games were to be played and that the results had nothing to do with school tests or evaluation. The student then reacted to the technique and the investigator recorded the responses. No difficulties were experienced by the investigator in writing down the responses. The only departure from the procedure used by Wallach and Kogan was in the amount of time allocated to informal association with the students. Wallach and Kogan allowed two weeks for this activity with each group of children. The total amount of time spent by the investigator in establishing relaxed rapport with the students during the pilot study was about fifteen hours or about half an hour per pupil. The time appeared to be sufficient, in view of the response obtained. However, it was felt that a shorter period of time for this aspect of the instrument would be necessary in the main study in view of the much larger number of students involved.

All students indicated that they could react satisfactorily to the instrument. This point was important for the study because the Wallach-Kogan instrument was used originally with fifth grade students with an average age of about 10 years 7 months. The six and nine year old students indicated that they were able to provide a satisfactory reaction to the five techniques in terms of number of responses produced. A summary of the quantity of responses is provided in Table 2 (page 93). However, the six year old group's response appeared to be rather low in relation to the other age groups. This factor, taken in conjunction with performance on the alternatives instrument, contributed to the decision to use seven year olds rather than six year olds in the main study.

Scoring the Divergent Instrument. The literature indicated that scoring for the dimensions of fluency and originality was the most reliable method. However, prior to scoring, the responses had to be assessed for validity in terms of the various stimuli. The procedure outlined in the following paragraphs was tried out in the pilot and employed in the main study.

After students responses had been recorded, they were processed independently by three judges. The judges were the investigator and two people with library backgrounds. The judges' task was to note any responses which appeared to be invalid in terms of the stimuli. The judges' reports were compared for agreement. A summary of the percentage of responses upon which full agreement was achieved initially is provided in Table 3 (page 94). These figures were obtained by tallying the total number of responses, tallying the number of responses about which there was any disagreement, and calculating the relevant percentage. The overall percentage of items upon which

Table 2

Total and Mean Responses of Students on
Wallach and Kogan Instrument
(Pilot Study)

Age	N	Responses	Mean
6	14	1,465	100.44
9	15	3,061	278.27
11	5	1,401	280.20

Table 3

Percentage of Responses to the Wallach and Kogan Instrument upon which Judges Reached Agreement (Pilot Study)

Age	Responses	Disagreements	% Agreement
6	1,465	136	90.72
9	3,061	226	92.62
11	1,401	100	92.86

agreement was reached, greater than ninety percent with each of the age levels, was felt to be satisfactory. It should be noted that agreement was relatively low on a few of the items. Examples were:

1. Six year olds: Alternate Uses, item 1 (Newspaper), 64.2%; item 4 (Cork), 60.7%; item 5 (Shoe), 77.1%. Pattern Meanings, item 1, 66.7%.

2. Nine year olds: Line Meanings, item 3, 57.2%; item 5, 73.8%; item 8, 69.3%. Pattern Meanings, item 8, 79.6%.

3. Eleven year olds: Alternate Uses, item 5 (Shoe), 64.8%. Line Meaning, item 5, 76.0%; item 8, 75.0%.

However, it was felt that the overall percentage of agreement was satisfactory enough to warrant the employment of this part of the scoring procedure in the main study. It was felt, also, that a higher percentage of agreement would be achieved by the judges in the main study as a result of experience in the pilot.

Wallach and Kogan (1965) employed independent judges with the instrument. They claimed ninety eight to ninety nine percent agreement on every item (p. 37). They also allowed the judges to resolve any discrepancies by discussion. After the initial comparison in the present pilot study, the judges discussed discrepancies, and virtually complete agreement was reached on the validity of the responses. The percentages of agreement quoted in Table 3 (page   ) represent the initial, unpractised, pre-discussion results achieved by the judges.

Wallach and Kogan scored for fluency and uniqueness, after their judges had processed students' responses. Scoring for fluency involves tallying each student's valid responses on each item. This was done in the pilot study, and a fluency score for each student on each item was obtained.

When scoring for uniqueness, Wallach and Kogan were interested in responses which occurred only once amongst their sample's reaction to each item. This interest stemmed from their concern to identify extremely creative individuals. The present study focussed on the general performance of groups of elementary school children, and scoring for uniqueness appeared somewhat extreme in such a context. By scoring for uniqueness, Wallach and Kogan appeared to ignore responses which could be highly original, though not unique. Since the literature indicated that scoring for originality, as distinct from uniqueness, was (with fluency) the most reliable method, the responses of students in the pilot study were scored for this dimension. This dimension allowed account to be taken of highly original responses.

Scoring for originality involves tabulating the responses for each item and applying a weighted scoring scale in which responses that appear least frequently are allotted higher scores. In this study a five point scale (4, 3, 2, 1, 0) was used. The distribution of the weights was based on a suggestion by Cropley (1973).

The basic rationale for the distribution of the weights lies in assuming that originality is distributed normally throughout the population. Therefore, a scoring scheme based on the normal curve appeared to be appropriate. The normal curve indicates that approximately sixteen percent of responses should fall beyond +1.0 standard deviations. About thirteen percent should fall between +1.0 and +2.0 standard deviations, with about three percent falling beyond +2.0 standard deviations.

Applying this idea to originality, it seemed reasonable to work in half standard deviations between +1.0 and +3.0 to obtain weights for responses in the following ranges, the weights being shown in brackets: Up to 1% (4); +1% to 2% (3); +2% to 9% (2); +9% to 16% (1); and +16% (0).

Having established the weighting scale, each students' responses for each item were tabulated and scored for originality. The fluency and originality scores for each item were then added to obtain a divergent thinking score. These divergent thinking scores were then added to obtain a total divergent score for each student for the complete thirty nine item instrument.

Categorization of the Students

When convergent and divergent thinking scores had been obtained, a trial attempt at categorization according to these abilities was made with the six year old and nine year old students. No attempt was made to categorize the eleven year old students because only five of them participated in the pilot study.

The students were ranked according to their scores on the convergent instrument. The median was calculated. Those students who scored above the median were categorized as high convergents. Those who scored below the median were categorized as low convergents. A similar procedure was followed with the divergent thinking scores. Some students were found to have scored above the median on both instruments. Others scored below the median on both. Some scored above the median on one of the instruments and below the median on the other. It was possible to categorize the students as High-High, High-Low, Low-High and Low-Low (convergency mentioned first). The numbers in each category from both age groups are reported in Table 4 (page 99).

The numbers likely to fall into each category were important as a guide for the main study. The investigator planned to have ten students in each of the four categories at each age level. This plan involved forty students at each level, making a total of one hundred and twenty. The categorization performed in the pilot study indicated that approximately sixty students at each age level would be required for the main study in order to fill the categories as planned.

Summary of the Report on the Pilot Study

The pilot study indicated that a range of elementary school students could react satisfactorily to the instruments in terms of providing an adequate quantity of responses. The relatively low number of responses to the alternatives and divergent thinking instruments from the six year old group suggested that seven year old students should be used in the main study.

Table 4

Numbers in each Category (Convergent and Divergent Thinking Ability): Six and Nine Year Old Students (Pilot Study)

Age	N	Category	N
6	14	H.H.	4
		H.L.	3
		L.H.	3
		L.L.	4
9	15	H.H.	5
		H.L.	3
		L.H.	3
		L.L.	4

Using the alternatives instrument indicated scope for the generation of two sets of alternatives: Courses of action and possible consequences of those courses of action. The instrument was used in the main study to elicit both sets of alternatives.

The assessment of the performances of independent judges in connection with the scoring of the divergent thinking instrument showed that a satisfactory degree of agreement had been achieved by them. A weighted scoring scale for originality, based on the normal curve, was tried out and found to be satisfactory. Categorization of students according to their convergent and divergent thinking scores was found to be possible and provided an indication of the number of students which would be required for the main study.

The performance of the eleven year old students indicated that the Colored Progressive Matrices might be too simple for this age level. The Standard version was decided upon for use with the eleven year olds in the main study.

The pilot study provided useful experience for the investigator and the judges in handling the instruments. The investigator found that it was possible to record students' responses by writing them down, thus relieving the students of problems in this area. The advantage of dealing with students individually, in terms of obtaining responses which were unequivocally those of the student concerned, became apparent during the pilot study. This advantage was the basis of a decision to conduct the whole study on the basis of dealing with individual students. This decision included the convergent instrument, which could have been administered to groups, according to Raven (1956; 1962).

One other important point emerged from the pilot study. The large amount of time necessary to collect data was highlighted by the experience gained in the pilot. This information proved valuable in the organization of data collection in the main study.

THE MAIN STUDY

This section of the chapter will be devoted to a discussion of the sample used in, and a report on the conduct of, the main study. Data collection for the main study was carried out from December, 1973 through May, 1974.

Sample

A school in an urban,middle socio-economic status area was the physical setting for the main study. The school was not selected randomly. It was used because it was made available to the investigator for an indefinite period, for the purpose of carrying out the study. Since data collection was lengthy, the availability of the school over an extended period of time was the chief factor in its use for the study. The school had about one hundred eleven year old students, approximately one hundred and sixty nine year olds and a similar number of seven year olds. Sixty students were selected randomly at each age level. The required final forty at each of the three age levels emerged from these numbers according to results on the convergent and divergent thinking instruments.

The mean age of the seven year old group was 7.66 years with a standard deviation of .24; of the nine year old group, 9.61 years with a standard deviation of .30; and of the eleven year old group, 11.56 years with a standard deviation of .27. Intelligence quotients were not available for the seven year old group. During the period of data collection (December, 1973 to May, 1974), the school counsellor administered the Canadian Lorge-Thorndike (B-1) intelligence quotient test to all nine and eleven year old students in the school. These intelligence quotients were made available to the investigator. The nine year old group had a mean intelligence quotient of 105.92 with a standard deviation of 13.07. The intelligence quotients in this group ranged from 82 to 142. The mean intelligence quotient for the eleven year old group was 107.97, with a standard deviation of 10.31. Intelligence quotients in the eleven year old group ranged from 91 to 126.

Some indication of the socio-economic background of the students can be gained from a survey of parental occupations. This information was obtained from the school records and has been tabulated in Table 5 (page 103). The occupations indicated a community which can be classified broadly as being of middle socio-economic status. Skilled trades and professions of various kinds were represented, in addition to service and managerial occupations. The occupations noted in Table 5 (page 103) were either fathers' occupations, or mothers' occupations where the father was not listed as living with the family. There were thirty four instances out of the one hundred and twenty where occupations were listed for both father and mother.

Table 5

Parental Occupations of Students in the Sample

Occupation	Number
Accountant	4
Agrologist	1
Chiropractor	1
Contracting/Construction	5
Consultants	3
Doctor/Physician	2
Engineer	13
Finance	3
Geologist	1
Labourer	7
Letter Carrier	3
Managerial	12
Pilot	3
Police/Armed Forces	9
Sales	15
Skilled Trades	27
Small Commercial Operator	2
Teacher	5
Truck Driver	4
N	120

In terms of intelligence quotient range and mean, the sample appeared to lie towards the higher end of what is usually regarded as the average range, that is, 90 to 110. The median scores for all three age levels on the Progressive Matrices were above those noted for the 50th percentile by Raven (1956; 1962). The socio-economic background of the sample appeared to be representative of many middle-class communities in urban areas.

Conduct of Main Study

The initial activity of the investigator involved selecting randomly sixty students from the seven, nine and eleven years age levels. This was done from class lists.

A small room was placed at the disposal of the investigator. All instruments were administered individually to students in this room. The nine year old students participated during December, 1973 and January, 1974, the eleven year olds during February and March, 1974, and the seven year olds during April and May, 1974.

The divergent instrument was administered over several meetings to all students at the relevant age level, and was followed by the convergent instrument, which required one meeting. These instruments were then scored as indicated in the section above on the pilot study. The students were ranked according to scores on both instruments, and medians calculated. The students were categorized as High-High, High-Low, Low-High and Low-Low. Ten students were selected from each of these categories at each age level. They were selected on the basis of having scores which placed them farthest from the medians.

The mean intelligence quotients for the four categories at the nine and eleven year age levels are reported in Table 6 (page 106).

After forming the four categories at each age level, the investigator showed the film loop Spray Paint (Moore and Woodruff, 1969) to the students, administering the instrument as described in the previous section on the pilot study. The responses were recorded manually by the investigator.

The investigator spent some time, during each meeting with individual students, in establishing a relaxed informal atmosphere. However, the time would have been much less than Wallach and Kogan spent. Nevertheless, the investigator spent about six months in the school, and became well known to the students of the three age levels involved in the study. During the period of the study, the investigator, who has lived outside Canada, gave several illustrated talks on other countries, followed by question and discussion periods, to students of the three age levels. These noon hour talks provided opportunities to establish rapport with students. Additionally, the investigator assisted in certain school functions such as the Track Meet and Canada Fitness Trials which took place during noon hour breaks. These activities seemed useful in breaking down student reserve and the investigator felt that the students reacted satisfactorily to the instruments as a result.

Table 6

Mean Intelligence Quotients for the Categories (H.H., H.L., L.H., L.L.) at the Seven and Nine Year Age Levels

Category	Age	I.Q.
Low-Low	9	94.5
Low-High	9	103.4
High-Low	9	113.7
High-High	9	112.1
Low-Low	11	102.7
Low-High	11	101.4
High-Low	11	116.0
High-High	11	111.8

SUMMARY

The instruments were described and reasons for their selection for use in the study were advanced. Problems with the reliability and validity of divergent thinking tests were noted and discussed. Methods of scoring divergent thinking tests were examined and a method for the study was decided upon. An account of the pilot study was provided. Important points to emerge from the pilot study included a decision to change from six to seven year old students, the possibility of obtaining two sets of alternatives, instead of one, from the film loop, and the achievement of a satisfactory degree of agreement among independent judges in connection with the divergent thinking instrument.

The sample was described in terms of age, intelligence quotient and socio-economic status and an outline of the conduct of the main study was provided. Analysis of the data will be discussed in Chapter 4.

CHAPTER 4

ANALYSIS OF THE DATA

INTRODUCTION

The purpose of this chapter is to report on the analysis of the data. Each hypothesis will be discussed in turn in terms ~~of the~~ statistical analysis, the Piagetian perspective and Kohlberg's moral development model. Both Piaget and Kohlberg have suggested that there might be parameters with regard to the quality of elementary children's responses. It was felt to be useful to view the data from these viewpoints.

Statistical

The design of the study involved the independent variables of age (three levels), convergence and divergence. Two dependent variables, suggested courses of action and consequences to those actions, were also involved. This design permitted statistical examination of the data by means of a three way analysis of variance (Anova 35, Division of Educational Research Services, University of Alberta). The Scheffé multiple comparisons test was also used.

The Piagetian Perspective

The Piagetian perspective involved acceptance of the students in the sample as being largely at concrete operations level, with cognitive attributes suggested by Piaget. Such attributes would include a developing ability to manage the functions of reversibility and conservation, to handle relations between objects and, to relate to classes of objects, and to cope with the mental manipulation of at least two variables while focussing thought on categories or classes. In this study, the students were asked to cope with two variables in the form of possible actions by the spectator in conjunction with possible actions by the vandals, while focussing thought on a relatively concrete social problem situation which had been depicted for them in vivid, visual fashion.

The purpose of studying the data from the Piagetian perspective was to probe for information about the ability of concrete operations level students to inquire and reason about a social problem. Specifically the analysis focussed on the following points which emerged during examination of the data. These points were felt to be important in the context of inquiry and reasoning:

1. Classes into which the students suggested courses of action might be fitted.
2. Consequences.
3. The students' choices of action after consideration of the consequences.
4. Impractical choices.
5. Choices which did not appear in individual students' initial suggestions.
6. The incidence of reasoning type statements, such as statements structured on the "If . . . then . . ." format.

It was found that the students' suggested courses of action fell into a number of distinct classes. An explanation of the classes is presented here to clarify the reports on the hypotheses. The classes which emerged were:

1. Appeals to authority.
2. Join the vandals.
3. Physical intervention by the spectator.
4. Non-physical intervention by the spectator.
5. Positive social action.
6. Passive interest.

Only seven suggested courses of action were unable to be classified and were labelled Miscellaneous.

Appeals to authority included suggestions about telling the police, the owner of the building, the vandals' parents, the spectator's parents or nearby adults. Suggestions about joining the vandals included all references to the spectator taking a can and spraying the wall or imitating the vandals in some way. Responses placed in the physical intervention class were those which suggested actual physical intervention by the spectator towards the vandals, such as fighting them or taking the cans from them. The class which was labelled non-physical intervention incorporated suggestions such as asking or telling them to stop. Positive action social responses displayed the idea of the spectator rectifying, in some way, the damage caused by the vandals, such as cleaning up the wall himself. Passive interest suggestions were those where students indicated that the spectator might merely stand and watch the vandals.

The Kohlberg Perspective

The Kohlberg perspective involved attempting to classify the students' responses according to the stages suggested in Kohlberg's (1963; 1964; 1966) moral development model. Specifically, the students' chosen courses of action and the reasons offered for them were examined for classification purposes. The aim was to probe for possible connections between moral development and thinking style which might provide clues about the moral perspective within which elementary school children examine social problems.

Kohlberg suggested three levels of sequential development: Preconventional, Conventional and Post Conventional. Each of the levels incorporated two stages. The levels and stages can be outlined as follows:

Preconventional	Stage 1.	Punishment and Obedience Orientation.
	Stage 2.	Instrumental Relativist Orientation.
Conventional	Stage 3.	Interpersonal Concordance Orientation.
	Stage 4.	Law and Order Orientation.
Post Conventional	Stage 5.	Social Contract Legalistic Orientation.
	Stage 6.	Universal Ethical Principle Orientation.

A brief explanation of the meanings of the stages is presented here prior to discussing the students' responses in terms of the model. The explanation is based on Porter and Taylor (1972, pp. 2-4).

The punishment and obedience orientation (Stage 1), involves judging the goodness or badness of an action by its physical consequences. At this level, the individual values the avoidance of punishment. He defers to power because power is vewed as a "good" or "right" phenomenon. At the instrumental relativist level (Stage 2), the individual values an action if it is instrumental in meeting his own needs. Actions for the benefit of others are seen as part of a pragmatic reciprocal cycle in which favours are expected to be returned.

The interpersonal concordance orientation (Stage 3) incorporates a judgement of action in terms of approval by the majority of peers or other members of society. Behaviour is seen as "nice" or "not nice," for example, according to whether or not it would meet with general approval. At the law and order level (Stage 4), attitudes tend to harden in terms of orientation towards authority, fixed rules maintaining the social order and doing one's duty.

The social-contract legalistic orientation (Stage 5) displays concern for individual rights and personal values within the framework of the rules for society as a whole. Procedures for reaching decisions binding upon society become important at this level and the possibility of changing rules or laws in the interests of society is part of this orientation. It is more flexible than Stage 4, where there is an attitude of acceptance towards fixed rules maintained by appropriate authority. Stage 6, universal ethical principle orientation, involves an emphasis on individual conscience. Concern for recognition of universal justice, equality of human rights, the dignity of human beings, and the importance of individual persons are important facets of this orientation.

In this study the students were asked to rationalize their chosen courses of action in a situation where the question of right and wrong was present. The vandalism situation was probably not as intense, in terms of conflict, as the Kohlberg instrument outlined by Porter and Taylor (1972, pp. 11-54). The moral dilemmas in this instrument involved such issues as life and death, stealing, informing to authorities about neighbours and parental rights over children's earnings. However, the vandalism incident was felt to incorporate a type of social problem which might be faced quite frequently by many elementary children, and could be expected to provide a stimulus for the students to indicate something of their moral reasoning when justifying their courses of action in response to it.

The responses were examined against the criteria indicated in the explanations of the stages provided by Porter and Taylor (1972). Responses were classified as Stage 1 if they indicated deference to authority, avoidance of punishment or expectation that authority would mete out punishment. Stage 2 responses were those which indicated that satisfaction of personal needs was the chief point of the rationalization. Responses classified as Stage 3 incorporated indications that the vandalism incident was viewed as "not nice" or would not meet with general approval. Responses were classified as Stage 4 if they indicated, in addition to a concern about wrong doing, a perspective wider than the defacement of a single wall, such as thought for the town, public buildings or streets; or displayed an orientation towards care for private property; or showed a tendency to comment in terms of "rights." None of the responses gave any indication that they should be rated at Stages 5 or 6.

ANALYSIS

Hypotheses 1-3: The Categories at each Age Level

Hypothesis 1 (7 Year Olds)

There will be no significant mean differences among seven year old students designated as a) High Convergent-High Divergent b) High Convergent-Low Divergent c) Low Convergent-High Divergent and d) Low Convergent-Low Divergent in their ability to generate alternatives.

Statistical Examination

Means were calculated for each category at the seven year age level for suggested courses of action and for consequences to those courses of action. These means are reported in Tables 7 (page 115) and 8 (page 116) respectively.

The three way analysis of variance produced Means Square Errors of 3.266 for suggested courses of action and 68.454 for consequences. These Means Square Errors were used in the Scheffé technique to produce significant mean values of 2.3 for suggested

Table 7

Means for Suggested Courses of Action Generated by the Categories (H.H., H.L., L.H., L.L.) at the Seven Year Age Level
n = 40

Category	n	Courses of Action	Mean
High-High	10	37	3.700
High-Low	10	33	3.300
Low-High	10	34	3.400
Low-Low	10	28	2.800

Table 8

Means for Consequences Generated by the Categories (H.H., H.L., L.H., L.L.) at the Seven Year Age Level

n = 40

Category	n	Consequences	Mean
High-High	10	82	8.200
High-Low	10	47	4.700
Low-High	10	76	7.600
Low-Low	10	26	2.600

courses of action and 10.5 for consequences at the .05 level of significance. The critical value of the F ratio for degrees of freedom 3 and 108 was employed in the technique. The result of the Scheffé test indicated that significant differences between categories for suggested courses of action would be 2.3 or greater. Significant differences between categories would be 10.5 or greater.

The results of the Scheffé comparisons on courses of action and consequences are reported in Tables 9 (page 118) and 10 (page 119). No significant differences were recorded among the categories on either courses of action or consequences.

The hypothesis was accepted. (However, see Additional Observations, page 195.)

The performance of the seven year old students in the sample was felt to be of particular interest in the context of inquiry or valuing. Of all the students who participated in the study, the seven year olds might have been expected to experience most difficulties in generating alternatives.

Only one seven year old was unable to generate more than one course of action. One category displayed some difficulty with the generation of consequences. In this category, Low Convergent-Low Divergent, six of the ten students were unable to produce a consequence to one or more of their suggested courses of action. However, all six who registered this difficulty with consequences were able to produce at least two suggested courses of action initially.

The data indicated that seven year old students might be

Table 9

Scheffé Multiple Comparisons of Means for Categories (H.H., H.L., L.H., L.L.) at 7 Year Age Level on Suggested Courses of Action n = 40

Category	H.H.	H.L.	L.H.	L.L.
Mean	3.7	3.3	3.4	2.8

Mean Differences	H.H./H.L.	.4
	H.H./L.H.	.3
	H.H./L.L.	.9
	H.L./L.H.	.1
	H.L./L.L.	.5
	L.H./L.L.	.6

Table 10

Scheffé Multiple Comparisons of Means for Categories
(H.H., H.L., L.H., L.L.) at 7 Year Age Level
on Consequences
n = 40

Category	H.H.	H.L.	L.H.	L.L.
Mean	8.2	4.7	7.6	2.6

Mean Differences	H.H./H.L.	3.5
	H.H./L.H.	.6
	H.H./L.L.	5.6
	H.L./L.H.	2.9
	H.L./L.L.	2.1
	L.H./L.L.	5.0

expected to generate a number of alternatives in the form of suggested courses of action, and consequences to those courses of action, in response to the type of social problem used in this investigation.

The Piagetian Perspective

Classes of Suggested Courses of Action. The seven year old students' responses fell into a number of clearly defined classes. The classes and the incidence of responses are reported in Table 11 (page 121). The results indicated that seven year old students produced clearly defined classes of suggested courses of action. The most numerous class was appeal to authority. Each category was represented in almost all the classes.

The following examples of students' suggested courses of action are provided to give an indication of the general quality of responses throughout the categories. Classification of the responses has been included.

Low-Low

Suggested Courses of Action

1. Tell them not to do it (Non-physical intervention).
2. He might take the cans off them and spray them (Physical intervention).
3. Phone the police (Appeal to authority).

Low-High

Suggested Courses of Action

1. Tell somebody in the building (Appeal to authority).
2. Tell his own mum (Appeal to authority).
3. Tell their mums (Appeal to authority).
4. Tell them not to do that anymore (Non-physical intervention).

Table 11

Classes of Suggested Courses of Action Generated by the Categories (H.H., H.L., L.H., L.L.) at the Seven Year Age Level
n = 40

Class of Response	Category H.H.	H.L.	L.H.	L.L.	Total	% of Age Level's Responses
Appeal to Authority	13	16	17	14	60	45.3
Join the Vandals	10	8	7	5	31	23.4
Ignore the Vandals	2	0	1	0	3	2.2
Physical Intervention by the Spectator	5	3	1	1	10	7.5
Non-physical Intervention by the Spectator	3	6	5	7	21	15.7
Positive Social Action	2	0	2	1	5	3.7
Passive Interest	2	0	1	0	3	2.2
Total	37	33	34	28	132	

High-Low

Suggested Courses of Action

1. Tell them to stop (Non-physical intervention).
2. He could take another can and spray the wall (Join the vandals).
3. He may phone their mums (Appeal to authority).
4. He could take the cans and throw them in the garbage (Physical intervention).

High-High

Suggested Courses of Action

1. He might tell his mom (Appeal to authority).
2. He might get another spray can and play with the boys too (Join the vandals).
3. He might tell them not to do it (Non-physical intervention).
4. He might fight them (Physical intervention).
5. He could tell his friend's mum if his own mum wasn't home (Appeal to authority).

These examples indicated that the quality of the suggested courses of action was much the same throughout the age level, irrespective of category based on convergent and divergent thinking ability. Each response produced several classes of suggested courses of activity.

Consequences. An attempt was made to classify the consequences. The attempt was unsuccessful because many consequences did not fall into clearly defined classes in the manner of the suggested courses of action. However, examples of courses of action and their consequences generated by the seven year olds are provided below to give an indication of the quality throughout the categories.

Low-Low

Suggested Courses of Action

1. If it was a school he could tell the principal.
2. He could spray the wall too.
3. He could tell the boys' parents.

Consequences

1A. They'd get into trouble.

2A. He could get into trouble too.
 B. They might spray it over each other.

3. No response.

Low-High

Suggested Courses of Action

1. Call the police.
2. Play with them.
3. Tell his mum and dad.

Consequences

1A. They might fight him.

2A. They could go on to break a window.
 B. They could go to another place and steal candy.
 C. They could start stealing bikes.

3A. They would take the boys to the police.

High-Low

Suggested Courses of Action

1. He might join in with them.
2. He might tell their mums.
3. They might start spraying each other.

Consequences

1A. Some adult might catch them all.

2A. They might not be able to go out for a week.
 B. They might not be allowed to go near the building again.

3A. They might get it in their mouths and be poisoned.

High-High

Suggested Courses of Action

1. He might do it with them.
2. He might tell his teachers.
3. He might tell whoever works in the building.
4. He might just sit and watch them.

Consequences

1A. The police may come and catch them all.
 B. Someone else may come along and tell on them.

2A. The boys might get the strap.
 B. They might have to wash the wall.

3A. They would take the boys to the police.
 B. If it was a school, they'd take the boys to the principal.

4A. An adult might come and take the three boys to the police station.

The quality of the consequences did not appear to differ markedly throughout the categories.

Choice of Action after Consideration of Consequences. This aspect of the students' responses was felt to be important because it provided an indication of the decisions which might be made by elementary school children after they had generated a number of courses of action and possible consequences to those actions. The choices made are reported in Table 12 (page 125). A few students made double choices and these have been included in the tables.

Over half of the choices were appeals to authority. No students opted to join the vandals. The result indicated that most seven year old students might favour appeal to authority of some kind when faced personally with a social problem such as vandalism. The appeals to authority choices were spread relatively evenly throughout the categories, suggesting that thinking style did not greatly affect the result.

Table 12

Choices of Action Made by the Categories (H.H., H.L., L.H., L.L.)
at the Seven Year Age Level
n = 40

Choice of Action	Category H.H.	H.L.	L.H.	L.L.	Total	% of Age Level's Responses
Appeal to Authority	7	7	5	7	26	61.9
Join the Vandals	0	0	0	0	0	0.0
Ignore the Vandals	2	0	0	0	2	4.7
Physical Intervention by the Spectator	1	2	3	1	7	16.7
Non-physical Intervention by the Spectator	0	1	2	4	7	16.7
Totals	10	10	10	12	42	

Impractical Choices. The final choices or decisions of students were examined with a view to commenting on their practicality. The practicality of the decisions was felt to be important in the context of valid inquiry and valuing. If students made impractical decisions after generating alternative courses of action and examining the consequences, for example, then their ability to handle inquiry or valuing processes effectively might be questioned.

The criterion of practicality was not applied to the initial courses of action which the students generated, because it was felt that they could suggest, legitimately, an impractical possibility for consideration at that point. Initially, they were exploring all possible courses of action which might be taken, and could speculate upon a variety of actions to which they were not committed.

One class of choice appeared to be impractical in the context of the problem. This class was physical intervention by the spectator. Choice of this class of action was judged to be impractical because the vandals outnumbered the spectator two to one. Physical intervention could be expected, in general, to be ineffective even by older students in the sample who placed themselves in the position of the speaker.

The percentages of impractical choices are reported in Table 13 (page 127). The percentages for the individual categories were of some interest, but the actual numbers of choices produced by each category were necessarily small and the percentages appear somewhat inflated because of this. However, the overall percentage was far from negligible. The result appears to indicate that some children at the seven year age level might make impractical decisions even after generating courses of action and considering the consequences.

Table 13

Percentages of Impractical (Physical Intervention) Choices of Action for the Categories (H.H., H.L., L.H., L.L.) at the Seven Year Age Level
n = 40

Category	No. of Choices	Impractical Choices	% of Category's Choices
High-High	10	1	10.00
High-Low	10	2	20.00
Low-High	10	3	30.00
Low-Low	12	1	8.33
Totals	42	7	16.66

No fantastic or miraculous type suggestions or choices appeared as was reported by Clegg and Hills (1968) in their work with the incidents from American history. Some impractical choices were made by students in each category, suggesting that thinking style might not have had an affect upon the result.

Choices which did not Appear in Students' Initial List of Courses of Action. The choices were examined for congruence with initial suggestions. It was felt that choices should be selected, logically, from the initially suggested courses of action. A tendency to depart from the initial suggestions could be interpreted as an indication of inconsistency in handling inquiry processes.

A number of choices made by students did not appear in their initial groups of suggestions. It should be noted, hoever, that where this occurred, the choices still fell within the classes indicated in Table 11 (page 121). The percentages of choices which did not appear in initial suggestions are reported in Table 14 (page 129).

The overall percentage was relatively high. The result suggested that many seven year old students might display this inconsistency when following through an inquiry process. This type of choice was made by some students in each of the categories.

The Incidence of Reasoning Type Statements. The data contained statements which could be classified as indications of formal type reasoning. However, the only type of reasoning statement produced by the students incorporated an "if . . . then . . ." structure. The incidence of these statements is reported in Table 15 (page 130). All statements made by the students when suggesting courses of action and consequences, making choices and giving reasons for the choices were taken into account.

Table 14

Percentages of Choices which Differed from Initially Suggested Courses of Action for the Categories (H.H., H.L., L.H., L.L.) at the Seven Year Age Level
n = 40

Category	No. of Choices	Choices which Differed	% of Category's Choices
High-High	10	2	20.00
High-Low	10	4	40.00
Low-High	10	7	70.00
Low-Low	12	3	25.00
Totals	42	16	38.10

Table 15

Percentages of Reasoning Type Statements Generated by the Categories (H.H., H.L., L.H., L.L.) at the Seven Year Age Level
n = 40

Category	No. of Statements	Reasoning Statements	% of Category's Statements
High-High	139	7	5.04
High-Low	100	0	0.00
Low-High	131	2	1.53
Low-Low	76	1	1.32
Totals	446	10	2.24

The overall percentage of reasoning type statements offered by the students was very small. The results seemed to indicate that seven year old students might not usually offer this type of statement in the course of inquiry or valuing. Thinking style did not appear to have any effect on the result, because the incidence of the statements varied very little across the categories.

The Kohlberg Perspective

An attempt was made to classify the students' responses in terms of Kohlberg's moral development model. The students' choices of action and their reasons for choosing those actions were used as the basis for the classification. The results of the classification are reported in Table 16 (page 132).

These results indicated that the largest group of seven year olds fell into Stage 1, Punishment and Obedience Orientation. However, about fifty percent of the students were classified at the Conventional level, either at Stage 3 or Stage 4. No students were classified into Stage 2.

This result was inconsistent with expectations stemming from Kohlberg's work with large numbers of children. Beck (1971) pointed out that Kohlberg's findings indicated children of the type used in the sample for the present study would fall largely into Stage 2, or a combination of Stages 2 and 3 (p. 16). This point is discussed later in the report. However, students from each category were represented at each of Stages 1, 3 and 4, suggesting that thinking

Table 16

Classification of the Seven Year Age Level Categories' (H.H., H.L., L.H., L.L.) Responses in Terms of Kohlberg's Moral Development Model
n = 40

Category	Stage 1	Stage 2	Stage 3	Stage 4
High-High	8	0	1	1
High-Low	3	0	2	5
Low-High	6	0	1	3
*Low-Low	2	0	4	2
Totals	19	0	8	11

* One No Response; One Combination of Stages 1 and 4.

style did not affect the classification.

Some responses classified at the various stages are listed below to provide examples of the reasons offered by students for their choices of action.

Stage 1 - Punishment and Obedience Orientation
(Pre-conventional)

Choice: I would tell their parents.
Reason: Because their parents would not want them to mess up the walls.

Choice: Tell their mothers.
Reason: Their mothers might be able to tell somebody.

Stage 3 - Interpersonal Concordance Orientation
(Conventional)

Choice: I would tell the manager of the building.
Reason: Because it isn't nice to spray stuff on people's walls.

Choice: Take the stuff away from them.
Reason: So they wouldn't mess it up any more because we want the walls nice and clean.

Stage 4 - Law and Order Orientation
(Conventional)

Choice: I would tell them not to do it.
Reason: Because they are messing up people's property.

Choice: I'd phone the police.
Reason: Maybe that's a special wall belonging to the government.

Hypothesis 2 (9 Year Olds)

There will be no significant mean differences among nine year old students designated as a) High Convergent-High Divergent b) High Convergent-Low Divergent c) Low Convergent-High Divergent and d) Low

Convergent-Low Divergent in their ability to generate alternatives.

Statistical Examination

The significant mean values of 2.3 for suggested courses of action and 10.5 for consequences applied to the nine year olds' means as well as the seven year old results. The means for the nine year old students are reported in Tables 17 (page 135) and 18 (page 136) respectively. The results of the Scheffé comparisons on suggested courses of action and consequences are reported in Tables 19 (page 137) and 20 (page 138). A significant difference was recorded between the High-High and Low-Low categories on suggested courses of action. No significant differences were found among the categories on consequences.

The hypothesis was rejected on the basis of the significant difference which emerged between the High-High and Low-Low categories on suggested courses of action.

The significant result on suggested courses of action was not confirmed on consequences, and was felt to be relatively unimportant when considered in isolation from the results for seven and eleven year olds. Nevertheless, the result indicated that significant differences in ability to generate alternatives, due to thinking style, might start to emerge at the nine year age level. The difference, in this case, was in favour of the category with the high divergent component.

All nine year old students were able to generate two or more

Table 17

Means for Suggested Courses of Action Generated by the
Categories (H.H., H.L., L.H., L.L.) at the
Nine Year Age Level
n = 40

Category	n	Courses of Action	Mean
High-High	10	59	5.90
High-Low	10	39	3.90
Low-High	10	49	4.90
Low-Low	10	33	3.30

Table 18

Means for Consequences Generated by the Categories (H.H., H.L., L.H., L.L.) at the Nine Year Age Level
n = 40

Category	n	Consequences	Mean
High-High	10	163	16.30
High-Low	10	83	8.30
Low-High	10	155	15.50
Low-Low	10	68	6.80

Table 19

Scheffé Multiple Comparisons of Means for Categories (H.H., H.L., L.H., L.L.) at 9 Year Age Level on Suggested Courses of Action

n = 40

Category	H.H.	H.L.	L.H.	L.L.
Mean	5.9	3.9	4.9	3.3
Mean Differences		H.H./H.L.	2.0	
		H.H./L.H.	1.0	
		H.H./L.L.	2.6*	
		H.L./L.H.	1.0	
		H.L./L.L.	0.6	
		L.H./L.L.	1.6	

*Significant at .05 level.

Table 20

Scheffé Multiple Comparisons of Means for Categories
(H.H., H.L., L.H., L.L.) at 9 Year Age Level
on Consequences
n = 40

Category	H.H.	H.L.	L.H.	L.L.
Mean	16.3	8.3	15.5	6.8
Mean Differences		H.H./H.L.	8.0	
		H.H./L.H.	0.8	
		H.H./L.L.	9.5	
		H.L./L.H.	7.2	
		H.L./L.L.	1.5	
		L.H./L.L.	8.7	

courses of action. All students at the nine year age level were able to generate at least one consequence to each of their suggested courses of action, the vast majority generating two or more.

The data indicated that nine year old students can generate a number of alternatives, such as suggested courses of action, and consequences to those actions, when faced with a social problem of the type presented to them in this study.

The Piagetian Perspective

Classes of Suggested Courses of Action. As with the seven year age level, the responses produced by the nine year olds fell into a number of clearly delineated classes. The numbers in each class are reported in Table 21 (page 140). The nine year old students produced the same clearly defined classes as the seven year olds. Appeal to authority was, again, the most numerous class. The categories were represented in almost every class.

One response did not appear to fit into the categories and was labelled Miscellaneous. The text of this reponse was, "He might make friends with them." The response did not seem to provide enough evidence for accurate classification.

Examples of the nine year old students' suggested courses of action are provided below to indicate something of the quality of responses throughout the categories. Classification of the responses has been included.

Table 21

Classes of Suggested Courses of Action Generated by the Categories (H.H., H.L., L.H., L.L.) at the Nine Year Age Level
n = 40

Class of Response	Category H.H.	H.L.	L.H.	L.L.	Total	% of Age Level's Responses
Appeal to Authority	19	18	15	12	64	35.0
Join the Vandals	15	9	9	8	41	22.8
Ignore the Vandals	5	1	3	1	10	5.5
Physical Intervention by the Spectator	7	3	11	6	27	15.0
Non-physical Intervention by the Spectator	9	7	9	5	30	16.6
Positive Social Action	2	1	1	1	6	3.4
Passive Interest	1	0	1	0	2	1.2
Miscellaneous	1	0	0	0	1	0.5
Totals	59	39	49	33	180	

Low-Low

Suggested Courses of Action

1. He could tell the people who owned the building (Appeal to authority).
2. He might join them and do it too (Join the vandals).
3. He might try to wash it off himself (Positive social action).
4. He might tell them to stop (Non-physical interference).

Low-High

Suggested Courses of Action

1. He might run away (Ignore the vandals).
2. He might tell the police (Appeal to authority).
3. He could start a fight (Physical intervention).
4. He could tell them that they shouldn't write on walls (Non-physical intervention).
5. He could throw a rock at them (Physical intervention).
6. Maybe he would stare at them (Passive interest).

High-Low

Suggested Courses of Action

1. He might tell them to throw the cans away (Non-physical intervention).
2. He could ask them for their names (Non-physical intervention).
3. When he found their names he could report them to the manager of the building (Appeal to authority).
4. He could tell the police (Appeal to authority).
5. He might spray too (Join the vandals).

High-High

Suggested Courses of Action

1. He could tell an adult in the building (Appeal to authority).
2. He could ask if there was any more spray paint and join in with them (Join the vandals).
3. He could tell the police (Appeal to authority).
4. He could beat them up (Physical intervention).
5. He might take the spray paint and start spray painting somewhere else (Join the vandals).
6. He might just go away and not tell anybody at that time (Ignore the vandals).
7. He might just forget all about it (Ignore the vandals).

These examples suggested that the quality of responses did not differ greatly throughout the categories. The sameness of quality throughout the categories suggested that convergent or divergent thinking ability did not appear to have any effect on the quality of responses. Each category tended to produce a similar variety of classes.

Consequences. The consequences were not amenable to classification because of their diversity. Examples of suggested courses of action and their consequences produced by the nine year olds are offered below to provide an indication of the quality of consequences throughout the categories at this age level.

Low-Low

Suggested Courses of Action

1. He could take the spray paint away from them.
2. He could do it with them if he found another can.
3. He could fight them.
4. He could call the police.
5. He could tell the manager of the building.

Consequences

1A. They could start a fight with him.
 B. He could get knocked out.
 C. He could get tied up and thrown somewhere.

2A. A cop could come by in a car and all three could get caught.
 B. Another boy might see them.

3A. The boy could get hurt badly.
 B. The other two boys might get knocked out if he was older and stronger than the two of them.

4A. They could get away before the police came.
 B. The police might think that the boy in red was lying.

5A. Before he got to the manager, the boys might be gone.
 B. The doors into the building might be locked.

Low-High

Suggested Courses of Action

1. He could have called the police.
2. If he knew their parents he could have phoned them.
3. He could start doing it with them.
4. He could have suggested that they all go and wreck another wall.
5. He could tell them to stop it.

Consequences

1A. The police could tell their parents. The parents could stop them from going out.
B. If the boys were playing hookey, they'd be found out.

2A. Their mother and father could stop their allowance, prevent them from going out or stop them from having friends in for five weeks.
B. Their parents might make them clean the wall and pick up all the garbage.

3A. They could all go on to smash windows.
B. They could start beating up kids.
C. They could start stealing.
D. They could all start playing hockey.
E. They all could start sneaking into shows without paying.
F. They could start sneaking out of class.
G. They might start wrecking little kids' forts.

4A. Same as for if he started doing it with them.

5A. They might have a fight because those two boys think they can do whatever they like.
B. They could tell their mothers that he is bossing them round.

High-Low

Suggested Courses of Action

1. He might tell them to throw the cans away.
2. He could ask them for their names.
3. When he found their names, he could report them to the manager of the building.
4. He could tell the police.
5. He might spray, too.

Consequences

1A. They might throw the cans away but go and get them again when the boy goes away.
B. They might keep on spraying.

2A. They might not tell him their names.
B. They might not tell him their full names.

3A. The manager might make them wash the wall off.
B. The manager could tell their mothers.

4A. The police might catch the boys.
B. The police could tell the boys' mothers, who would punish them.

5A. He could get caught too and all three would be in trouble.

High-High

Suggested Courses of Action

1. He could help them mess the wall up.
2. He could tell a policeman.
3. He could tell a man walking down the street.
4. If it was a school wall he could tell the principal.
5. He could ask them why they were doing that.
6. He could ask them where they found the paint cans.

Consequences

1A. They could put more paint on the wall.
B. They might spray each other.
C. They might start to agree.

2A. The policeman would tell them to stop it.
B. They might go away and not come back.
C. They might come back after the policeman had gone and start spraying again.
D. They might keep on doing it.

3A. The man might say I haven't got time and walk away.
B. The man might stop them.

4A. The principal would send them to the office.
B. If she didn't really care, she might stop them and threaten to send them to the office if they did it again.
C. She might stop them, but they might come back later and do it again.

5A. They might say they wanted to fool around.
B. They might say it was none of his business.

6A. They could say they found them in the trash cans.
B. They might lie to him to stop him from playing with them.

A difference in quality could be discerned amongst the categories. It appeared to step from the effect of differences in quantity rather than individual responses. The Low-High and High-Low students' responses, outlined above, provide an example. Both students generated five alternatives initially, but the Low-High student produced fourteen consequences to the other student's nine. The Low-High student's response on consequences gave the impression that the problem was being viewed from a perspective wider than that of the other student.

This view suggested that thinking style could affect the overall quality of consequences, if one of the styles tended to produce more than the other.

Choice of Action after Consideration of Consequences. The choices made by the students after they had generated suggested courses of action and consequences are reported in Table 22 (page 146). Several students made double choices and these have been included in the tables.

Appeals to authority formed the largest class. No students chose to join the vandals. The result indicated that most nine year old students might choose to appeal to authority when confronted with a social problem of the kind employed in this study. Over 40 percent of each category chose to appeal to authority. This result suggested that convergent and divergent thinking ability might not have much effect on choices of action in a social problem inquiry context.

One response could not be classified. The text of this response was "I wouldn't know what to do." Its content did not point to any of the classes.

Impractical Choices. The percentages of impractical choices are reported in Table 23 (page 147). The physical intervention class

Table 22

Choices of Action Made by the Categories (H.H., H.L., L.H., L.L.)
at the Nine Year Age Level
n = 40

Choice of Action	Category H.H.	H.L.	L.H.	L.L.	Total	% of Age Level's Responses
Appeal to Authority	10	7	7	4	28	65.1
Join the Vandals	0	0	0	0	0	0.0
Ignore the Vandals	0	0	1	0	1	2.3
Physical Intervention by the Spectator	1	1	1	2	5	11.7
Non-Physical Intervention by the Spectator	0	3	2	3	8	18.6
Miscellaneous	0	0	0	1	1	2.3
Totals	11	11	11	10	43	

Table 23

Percentages of Impractical (Physical Intervention) Choices of Action for the Categories (H.H., H.L., L.H., L.L.) at the Nine Year Age Level
n = 40

Category	No. of Choices	Impractical Choices	% of Category's Choices
High-High	11	1	9.10
High-Low	11	1	9.10
Low-High	11	1	9.10
Low-Low	10	2	20.00
Totals	43	5	11.70

was judged to be impractical because the vandals outnumbered the spectator. The results indicated that a number of children at the nine year age level might be expected to suggest impractical solutions to certain kinds of social problems, even after considering a number of courses of action and their consequences.

The percentages were fairly even throughout the categories. This eveness suggested that thinking style may not have an affect when nine year old children make choices or decisions at the end of an inquiry process in a social problem context.

The overall percentage was relatively small, but cannot be ignored.

Choices which did not Appear in the Students' Initial List of Courses of Action. The percentages of choices, for each category, which did not appear in the students' initial lists are reported in Table 24 (page 148). All of these choices fell within the classes indicated in Table 11 (page 121).

The overall percentage was relatively high. The result suggested that many nine year old students might be expected to suggest choices of action at the end of an inquiry process on a social problem which have not been considered during the process. This type of choice was made by representatives of all the categories. The appearance of this type of choice in each category suggested that thinking style might not have a great effect in causing students to perform in this way.

Table 24

Percentages of Choices which Differed from Initially Suggested Courses of Action for the Categories (H.H., H.L., L.H., L.L.) at the Nine Year Age Level

n = 40

Category	No. of Choices	Choices which Differed	% of Category's Choices
High-High	11	1	9.10
High-Low	11	3	27.30
Low-High	11	1	9.10
Low-Low	10	4	40.00
Totals	43	9	20.93

The Incidence of Reasoning Type Statements. The nine year old students generated statements about courses of action, consequences, choices of action and reasons for making choices. All these statements were examined to see if any of them could be classified as being reasoning types having structures such as "if . . . then . . ."

The incidence and percentages of these statements are reported in Table 25 (page 151). The percentages were very even throughout the categories, suggesting that thinking style was not a factor in their occurrence. The percentages were also very small. The result seemed to indicate that nine year old students might not naturally produce reasoning statements of the "if . . . then . . ." type in the course of an inquiry process on social problems.

The Kohlberg Perspective

The students' choices of action and their reasons for the choices were examined in an attempt to classify them into Kohlberg's moral development stages. The classification is reported in Table 26 (page 152). Stage 1 contained the largest number of students. Approximately 50 percent of the students were classified at the Conventional level (Stages 3 and 4). Students from each category were represented at each stage with the exception of Stage 2, at which no students were rated. The presence of students from all categories at the three stages which emerged from the data appeared to indicate that thinking style did not affect the stages at which the students were rated.

Table 25

Percentages of Reasoning Type Statements Generated by the Categories (H.H., H.L., L.H., L.L.) at the Nine Year Age Level
n = 40

Category	No. of Statements	Reasoning Statements	% of Category's Statements
High-High	243	11	4.53
High-Low	143	7	4.89
Low-High	225	12	5.33
Low-Low	121	6	4.96
Totals	732	36	4.92

Table 26

Classification of the Nine Year Age Level Categories' (H.H., H.L., L.H., L.L.) Responses in Terms of Kohlberg's Moral Development Model
n = 40

Category	Stage 1	Stage 2	Stage 3	Stage 4
High-High	4	0	2	4
High-Low	4	0	1	5
Low-High	4	0	1	5
*Low-Low	7	0	0	1
Totals	19	0	4	15

* Two No Responses.

Two students gave reasons which amounted to "no response" for the purposes of classification into Stages.

Some responses classified at the various stages are provided below to illustrate the reasons offered by students for their choices of action.

Stage 1 - Punishment and Obedience Orientation
(Pre-conventional)

Choice: I wouldn't boss them around. I'd firmly tell them not to do it again, because the storekeepr will get mad. I'd advise them to tell the storekeeper that they did it and offer to clean it up.
Reason: If I got bossy they might spray me and spray paint is dangerous if it gets in your eyes.

Choice: I'd tell a grown up across the street or another grown up in the building.
Reason: Because it would look ugly if I helped them and I would get it too.

Stage 3 - Interpersonal Concordance Orientation
(Conventional)

Choice: I'd tell them not to.
Reason: I wouldn't approve of them ruining the wall.

Choice: I'd try to stop them.
Reason: I don't think it's nice to mess up walls.

Stage 4 - Law and Order Orientation
(Conventional)

Choice: Tell them to stop it.
Reason: Because they have no right to do that.

Choice: I would not join them. I would tell the boys' parents.
Reason: Because they were doing something against the law.

Hypothesis 3 (11 Year Olds)

There will be no significant mean differences among eleven year old students designated as a) High Convergent-High Divergent b) High Convergent-Low Divergent c) Low Convergent-High Divergent and d) Low Convergent-Low Divergent in their ability to generate alternatives.

Statistical Examination

The significant mean values of 2.3 for suggested courses of action and 10.5 for consequences were relevant to the elven year olds' means as well as the seven and nine year old results. The means for the eleven year old students are reported in Tables 27 (page 155) and 28 (page 156).

The results of the Scheffé comparisons on suggested courses of action and consequences are reported in Tables 29 (page 157) and 30 (page 158). Significant differences emerged between the following categories on suggested courses of action:

High-High and High-Low
High-High and Low-Low.

Significant differences were recorded between the following categories on consequences:

High-High and High-Low
High-High and Low-Low
High-Low and Low-High
Low-High and Low-Low.

Table 27

Means for Suggested Courses of Action Generated by the Categories (H.H., H.L., L.H., L.L.) at the Eleven Year Age Level
n = 40

Category	n	Courses of Action	Mean
High-High	10	71	7.10
High-Low	10	46	4.60
Low-High	10	63	6.30
Low-Low	10	46	4.60

Table 28

Means for Consequences Generated by the Categories (H.H., H.L., L.H., L.L.) at the Eleven Year Age Level
n = 40

Category	n	Consequences	Mean
High-High	10	253	25.30
High-Low	10	109	10.90
Low-High	10	242	24.20
Low-Low	10	98	9.80

Table 29

Scheffé Multiple Comparisons of Means for Categories (H.H., H.L., L.H., L.L.) at 11 Year Age Level on Suggested Courses of Action
n = 40

Category	H.H.	H.L.	L.H.	L.L.
Mean	7.1	4.6	6.3	4.6
Mean Differences		H.H./H.L.	2.5*	
		H.H./L.H.	0.8	
		H.H./L.L.	2.5*	
		H.L./L.H.	1.7	
		H.L./L.L.	0.0	
		L.H./L.L.	1.7	

*Significant at .05 level.

Table 30

Scheffé Multiple Comparisons of Means for Categories
(H.H., H.L., L.H., L.L.) at 11 Year Age Level
on Consequences
n = 40

Category	H.H.	H.L.	L.H.	L.L.
Mean	25.3	10.9	24.2	9.8
Mean Differences		H.H./H.L.	14.4*	
		H.H./L.H.	1.1	
		H.H./L.L.	15.5*	
		H.L./L.H.	13.3*	
		H.L./L.L.	1.1	
		L.H./L.L.	14.4*	

*Significant at .05 level.

The hypothesis was rejected.

The result indicated that significant differences in the ability to generate alternatives might be expected to emerge clearly at the eleven year age level, among students categorized according to convergent and divergent thinking ability. The differences were in favour of the categories with the high divergent component. These categories produced more courses of action and consequences than the other two categories.

The data suggested that eleven year old students can generate quite large numbers of alternatives in response to the type of social problem employed in the study. All students were able to generate at least three suggested courses of action in response to the vandalism incident. One student generated fourteen. The number of consequences generated for specific courses of action ranged from one to nine.

The Piagetian Perspective

Classes of Suggested Courses of Action.

The responses fell into the same classes which were noted in the seven and nine year old responses. The numbers in each class are reported in Table 31 (page 160). The largest class in each category was appeals to authority. Each category had some representatives in almost all the classes.

Seven responses were classified as "Miscellaneous" because they did not appear to fit into any of the classes. These responses were as follows:

He might steal something from the building.

Table 31

Classes of Suggested Courses of Action Generated by the Categories (H.H., H.L., L.H., L.L.) at the Eleven Year Age Level

n = 40

Class of Response	Categories H.H.	 H.L.	 L.H.	 L.L.	Total	% of Age Level's Responses
Appeal to Authority	24	21	25	21	91	40.2
Join the Vandals	18	7	11	11	47	20.8
Ignore the Vandals	6	7	6	5	24	10.6
Physical Intervention by the Spectator	7	4	10	6	27	11.9
Non-physical Intervention by the Spectator	7	1	5	4	17	7.6
Positive Social Action	3	0	3	1	7	3.2
Passive Interest	1	2	2	1	6	2.6
Miscellaneous	5	0	2	0	7	3.1
Totals	71	42	64	49	226	

If he was real nice he might take the blame for it.
He could blackmail them by promising not to tell if they gave him some money.
He could make a big joke about it.
He could tell everyone at school.
He could make a deal with the boys not to tell if they gave him some money or candy.
He might start laughing.

Examples of the eleven year old students' suggested courses of action are provided below. The examples have been provided to give an idea of the quality of the responses in the various categories. Classification of the responses has been included.

Low-Low

Suggested Courses of Action

1. He might tell the police about it (Appeal to authority).
2. He might join them and do the same thing (Join the vandals).
3. He might walk away and forget about it (Ignore the vandals).
4. He could bring them to the police station (Physical intervention).
5. He could erase the paint off the building (Positive social action).

Low-High

Suggested Courses of Action

1. He might tell the police (Appeal to authority).
2. He might join in (Join the vandals).
3. He could tell their parents (Appeal to authority).
4. He could ask them to do it again (Non-physical intervention).
5. He could try to clean it off (Positive social action).
6. He could try to make it worse by using a spray can of his own (Join the vandals).

High-Low

Suggested Courses of Action

1. He could tell the police (Appeal to authority).
2. He could try to stop them (Physical intervention).
3. He could join in and do it himself (Join the vandals).

4. He could tell his parents (Appeal to authority).
5. He could start a fight to stop them from doing it (Physical intervention).

High-High

Suggested Courses of Action

1. He might tell the manager of the building (Appeal to authority).
2. He might help them wash the paint off the building (Positive social action).
3. He might muck up the wall with them (Join the vandals).
4. He could tell the boys' parents (Appeal to authority).
5. If he was real nice, he might take the blame for it (Miscellaneous).
6. He might tell them to stop doing it (Non-physical intervention).
7. He might just walk right past it all (Ignore the vandals).

Examination of responses such as these suggested that the quality of the responses did not differ materially throughout the categories. Moreover, the quality appeared to be much the same as that provided by the seven and nine year olds, irrespective of convergent and divergent thinking ability.

Consequences. The diversity of the consequences precluded meaningful classification of them. The quality of the consequences throughout the categories has been illustrated in the examples provided below.

Low-Low

Suggested Courses of Action

1. Tell the owner of the building.
2. He might mind his own business and leave them to do what they want.
3. Tell them to wash it off.
4. Phone the cops.

Consequences

1A. The owner of the building might make them wash it off.
B. The owner of the building could phone the police.

2A. They could keep on spraying the wall.
B. They could run off and leave the mess.

3A. They might not listen to him.
B. They could spray paint him.

4A. The boys would probably run off.

Low-High

Suggested Courses of Action

1. He might tell the police.
2. He might join in.
3. He could tell their parents.
4. He could ask them to do it again someplace else.
5. He could try to clean it off.
6. He could try to make it worse by using a spray can of his own.

Consequences

1A. The boys might get caught.
B. Their parents would be told.
C. He would lose the boys as friends.
D. He could get beat up by the boys.
E. His parents might give him a rough time by telling the police about the boys.

2A. He could play tick tack toe.
B. He could write people's names on the wall.
C. He could draw funny lines.

3A. He might get hit by the boys.
B. Their parents might say it didn't matter.
C. Their parents might tell him to get lost.
D. The parents might give the boys a licking.
E. The parents could keep the boys at home for a while.

4A. They might go to another part of town.
B. He would follow them to the new place and then tell an authority.

5A. He could get caught and get the blame for it.
B. He might make a bigger mess than ever.
C. He could get paint all over himself.
D. He could put paint on people passing by.

6A. He could really cover the wall.
B. The paint could get on the pavement as well.
C. He might get caught by somebody.

D. The spray can might explode.

High-Low

Suggested Courses of Action

1. He might mess up the wall with them.
2. He could tell the police.
3. He could tell the people who owned the building.
4. He might just leave and not tell anyone.
5. He might just watch them.

Consequences

1A. They might all get caught.
B. He might get into a fight with the boys over how to paint the wall.

2A. The boys could get caught by the police.
B. They might be made to wash it off.
C. They might be made to repaint the wall.
D. The police might tell their parents and they would get the strap.

3A. The people in the building might tell the police.
B. The people might tell their parents.
C. The boys might have to buy paint to repaint the wall.

4A. The boys might think he was going to tell on them and fight him.

5A. The boys might think he would tell someone later.
B. The boys might think he is bothering them.
C. The boys might make him mess up the wall so that he'd get into trouble, too, if they were caught.

High-High

Suggested Courses of Action

1. He might spray the walls with them.
2. He might tell his parents.
3. He might try to stop them.
4. He might find a can, too.
5. He could tell a policeman.
6. He might tell them to wash it off.
7. He could tell someone in the building.

Consequences

1A. Then he would get into trouble, too.
B. They might start spraying each other and then he'd get it from his mum.
C. Another boy could see them and report them to people in

the building, his parents or the police.

2A. The two boys might get into trouble.
B. The two boys might get mad at him and beat him up.
C. The boys might be made to clean it off and repaint it.

3A. He might get sprayed.
B. They might beat him up.
C. If he was successful, they wouldn't be able to spray the wall anymore.

4A. He would start spraying the walls too.
B. Having found where the cans came from, he could tell the people not to put spray cans in the garbage.

5A. The boys might be caught and sent to a discipline home.
B. The police might tell their parents and they'd get a licking.

6A. They'd refuse.
B. If they refused, he might get a parent.
C. If he kept bugging them, they might beat him up.

7A. They'd make the boys wash it off.
B. The boys could say that they didn't realize what they were doing.

The number of consequences generated seemed to make a difference in quality. The Low-Low and High-Low students' responses above may be compared. Both generated about the same number of courses of action initially, four and five respectively. However, the High-Low student generated thirteen consequences against the other student's seven. The High-Low student appeared to have created a much richer context from which to examine the problem.

Choices of Action after Consideration of Consequences. The students' choices of action are reported in Table 32 (page 166). A few students made double choices and these have been included in the tables.

Appeals to authority formed the most numerous group. Over 40 percent of each category chose to appeal to authority. This

Table 32

Choices of Action Made by the Categories (H.H., H.L., L.H., L.L.) at the Eleven Year Age Level
n = 40

Choice of Action	Category H.H.	H.L.	L.H.	L.L.	Total	% of Age Level's Responses
Appeal to Authority	4	7	7	6	24	52.2
Join the Vandals	1	0	0	1	2	4.4
Ignore the Vandals	4	2	1	2	9	19.5
Physical Intervention by the Spectator	2	2	3	0	7	15.2
Non-physical Intervention by the Spectator	1	1	1	1	4	8.7
Totals	12	12	12	10	46	

result suggested that thinking style might not affect the making of choices after consideration of consequences. Almost every class had representatives from each category.

Impractical Choices. The percentages of impractical choices (physical intervention) are reported in Table 33 (page 168). The results indicated that a number of eleven year old children might be expected to make impractical choices of action in response to a social problem, notwithstanding consideration of consequences.

The Low-Low category made no impractical choices. This would appear to be a chance result. The other three categories produced similar percentages, suggesting that the making of impractical choices at the end of an inquiry process on a social problem may not be affected by thinking style.

The overall percentage was relatively small, but far from negligible.

Choices which did not Appear in the Students' Initial List of Courses of Action. The percentages of courses of action, for each category, which did not appear in the students' initial lists are reported in Table 34 (page 169). All these choices were within the classes indicated in Table 11 (page 121).

The overall percentage was relatively low, but cannot be ignored. The percentages were fairly even across the categories, suggesting that thinking style was not a factor in producing this type of response.

Table 33

Percentages of Impractical (Physical Intervention) Choices of Action for the Categories (H.H., H.L., L.H., L.L.) at the Eleven Year Age Level
n = 40

Category	No. of Choices	Impractical Choices	% of Category's Choices
High-High	12	2	16.66
High-Low	12	2	16.66
Low-High	12	3	25.00
Low-Low	10	0	0.00
Totals	46	7	15.21

Table 34

Percentages of Choices which Differed from Initially Suggested Courses of Action for the Categories (H.H., H.L., L.H., L.L.) at the Eleven Year Age Level
n = 40

Category	No. of Choices	Choices which Differed	% of Category's Choices
High-High	12	2	16.66
High-Low	12	1	8.33
Low-High	12	1	8.33
Low-Low	10	1	10.00
Totals	46	5	10.86

The Incidence of Reasoning Type Statements. The percentages of reasoning type statements for the various categories are reported in Table 35 (page 171). Suggested courses of action, consequences, choices of action and reasons for the choices were examined. The percentages were very low, and did not differ greatly from category to category. Thinking style did not appear to have any effect on the result.

The Kohlberg Perspective

The students' choices of action and the reasons offered for these choices were examined. An attempt to classify these responses into Kohlberg's moral development stages was made. The results of the classification are reported in Table 36 (page 172).

Stage 1 contained the largest number of students. However, almost half the students were classified at the conventional level (Stages 3 and 4). Stages 1 and 4, into which most of the students were classified, contained fairly even representation from the various categories. This result appeared to indicate that convergent and divergent thinking ability did not exercise much effect on the moral reasoning of the students.

Some of the responses which were classified into the various stages are provided below as examples of the reasons produced by the students.

Table 35

Perçentages of Reasoning Type Statements Generated by the Categories (H.H., H.L., L.H., L.L.) at the Eleven Year Age Level

n = 40

Category	No. of Statements	Reasoning Statements	% of Category's Statements
High-High	346	20	5.78
High-Low	177	13	7.34
Low-High	337	14	4.15
Low-Low	164	8	4.89
Totals	1024	55	5.37

Table 36

Classification of the Eleven Year Age Level Categories' (H.H., H.L., L.H., L.L.) Responses in Terms of Kohlberg's Moral Development Model
n = 40

Category	Stage 1	Stage 2	Stage 3	Stage 4
High-High	4	1	1	4
High-Low	7	0	0	3
Low-High	4	0	1	5
*Low-Low	6	1	0	2
Totals	21	2	2	14

* One Stages 1 and 4.

Stage 1 - Punishment and Obedience Orientation
(Pre-Conventional)

Choice: I'd walk away.
Reason: I wouldn't want to get caught like that, because I'd get into trouble from my parents.

Choice: I'd forget about it.
Reason: I would not get into any trouble.

Stage 2 - Instrumental Relativist Orientation
(Pre-Conventional)

Choice: I'd accept the can and join them.
Reason: Because it would be fun to do that.

Choice: If I didn't know them and knew I could beat them up, I'd take the cans off them and then beat them up.
Reason: Cans are expensive. I have models I'd like to paint.

Stage 3 - Interpersonal Concordance Orientation
(Conventional)

Choice: I would tell my parents.
Reason: I don't think it's very nice for people to wreck walls.

Choice: Tell the police.
Reason: It's not nice to wreck property.

Stage 4 - Law and Order Orientation
(Conventional)

Choice: I'd go get an adult.
Reason: Because they were doing the wrong thing.

Choice: I'd tell the government.
Reason: Because they were damaging private property.

Summary of Analysis on Hypotheses 1-3: The Categories within each Age Level

Statistical Examination

Significant differences among the categories in the ability to generate alternatives did not start to emerge until the nine year age level, and were displayed most clearly at the eleven year age level. Differences were in favour of categories which contained a high divergent element. This result suggested that thinking style may have an effect on the ability to generate numbers of alternatives, with high divergent thinking ability being likely to produce more alternatives than low divergent thinking ability.

In general, all students at each level, irrespective of category, indicated that they could generate numbers of alternatives in the form of suggested courses of action and consequences to those actions when faced with a social problem of the kind depicted in the vandalism incident.

The Piagetian Perspective

The analysis in this section probed for information on two main points:

1. The ability of concrete operations children to inquire and reason.

2. The effects of thinking style on the ability to inquire and reason.

The Ability to Inquire and Reason. It was found that the students at each age level could generate a number of clearly defined classes of suggested courses of action; that a relatively high percentage of students (up to 10 percent of an age level) might make impractical choices after consideration of consequences; that a relatively high percentage (10-38 percent) might make choices at the end of an inquiry process which were not considered initially; and that very few (less than 6 percent) reasoning type statements might be expected from children at the concrete operations level.

The Effects of Thinking Style. Each category produced the same classes of suggested courses of action, at each age level. The majority of students in each category, at all age levels, suggested courses of action which could be classified as appeals to authority. The majority of students in each category at each age level selected appeals to authority as their choice of action. Students from all categories at each age level made impractical choices and choices which did not appear in their initial suggestions. All categories produced similar low percentages of reasoning type statements. Large differences among categories on items such as choices of action or impractical choices tended to even out over the age level as a whole. These results suggested that thinking style might not have much effect on the aspects of inquiry mentioned above.

The impression, that thinking style did not affect greatly the aspects of inquiry under investigation, was strengthened by an examination of the quality of the students' responses in the various categories. The quality of courses of action and choices of action did not differ markedly amongst the categories. The students produced similar classes of suggested courses of action. Most sets of suggested courses of action contained similar proportions of the various classes.

However, it was felt that a difference in quality among the categories could be discerned with consequences. Larger numbers of consequences gave the impression of a more detailed approach to the problem. Since the categories with a high divergent component tended to produce more consequences, especially at nine and eleven year age levels, it would appear that thinking style might have an effect on the ability to generate this type of alternative.

The Kohlberg Perspective

Each category at each age level tended to follow the same pattern: A large group at Stage 1, and two smaller groups at Stages 3 and 4 (Conventional Level) with either none or very few at Stage 2. The results suggested that elementary students might usually be at three main stages of moral development.

Reservations were entertained by the investigator concerning the moral development classifications which were made during the study. These reservations are discussed later in this report. However, the similarity of the patterns of stages for each category at each age level suggested that thinking style had little or no effect on moral development.

Hypothesis 4: The Age Levels

There will be no significant mean differences among seven, nine and eleven year old students in their ability to generate alternatives.

Statistical Examination

An analysis of variance was conducted to determine if there were significant differences among the age levels on suggested courses of activities and consequences. The result of this analysis is reported in Table 37 (page 178). The result indicated that significant differences had occurred amongst the age levels on both courses of action and consequences.

A multiple comparisons test on the age level means, for courses of action and consequences, was conducted to establish the age levels between which the significant differences had occurred. The results of the comparisons test are reported in Table 38 (page 179). The results indicated that there were significant differences between the seven and nine year age levels, and also between the seven and eleven year age levels on both courses of action and consequences. A further check indicated that significant differences had been recorded between the nine and eleven year age levels on courses of action and consequences.

The hypothesis was rejected.

The results indicated that older students generated significantly more alternatives than younger students. It would appear that age might have had an effect on the number of alternatives which elementary students generated.

Table 37

Analysis of Variance for 7, 9 and 11 Year Age Levels on Suggested Courses of Action and Consequences
N = 120

Source	S.S.	df	M.S.	F.	P.
Age (Suggested Courses of Action)	110.466	2	55.233	16.908	0.000*
Age (Consequences)	2773.12	2	1386.56	20.255	0.000*

*Significant at .05 level.

Table 38

Comparison of Means for 7, 9 and 11 Year Age Levels on Suggested Courses of Action and Consequences

N = 120

Age Levels	Means	Var.	F.	df	P.
Suggested Courses of Action					
7, 9	3.3, 4.5	0.163	4.408	2,108	0.014*
7, 11	3.3, 5.65	0.163	16.905	2,108	0.000*
Consequences					
Age Levels	Means	Var.	F.	df	P.
7, 9	5.8, 11.7	3.422	5.172	2,108	0.007*
7, 11	5.8, 17.5	3.422	20.255	2,108	0.000*

*Significant at .05 level.

The Piagetian Perspective

In this section the examination of the data will focus on the age levels, rather than categories within them.

Classes of Suggested Courses of Action. The results of the examination of classes of suggested courses of action were presented as percentages of the totals for each age level. It was felt that percentages would present a clearer picture of the pattern of responses at each age level. The percentages are reported in Table 39 (page 181). The overall results indicated relatively little difference in the percentage of responses in each class of action across the age levels. There was no uniformity of rises or falls across the age levels. However, at each age level the largest classes of suggested actions were appeals to authority, joining the vandals and some kind of intervention by the spectator.

This result suggested that age did not have an affect on the classes generated, or on the proportions of them which were generated at each age level.

The quality of the courses of action was illustrated by examples of responses provided by the thinking style categories in the previous section. However, further examples are presented here to provide an opportunity to compare quality, having the age levels, rather than the categories, in mind. Classifications of the responses have been included.

Many seven year olds generated four suggested courses of

Table 39

Percentages for Each Class of Suggested Courses of Action at the 7, 9 and 11 Year Age Levels
N = 120

Class of Response	Age Level 7	 9	 11
Appeal to Authority	45.3	35.0	40.2
Join the Vandals	23.4	22.8	20.8
Ignore the Vandals	2.2	5.5	10.6
Physical Intervention by the Spectator	7.5	15.0	11.9
Non-physical Intervention by the Spectator	15.5	16.6	7.6
Positive Social Action	3.7	3.4	3.2
Passive Interest	2.2	1.2	2.6
Miscellaneous	0.0	0.5	3.1

action. The following example was typical of many responses from the seven year age level.

Seven Year Age Level

Suggested Courses of Action

1. He could tell the person in the building (Appeal to authority).
2. He could ask where the paint came from, get some and spray it too (Join the vandals).
3. He might tell the police (Appeal to authority).
4. He might tell them to stop it (Non-physical intervention).

Quite a number of nine year olds generated five suggested courses of action and the following example is representative of the performance at the age level. Classifications have been included.

Nine Year Age Level

Suggested Courses of Action

1. He might spray paint with the boys (Join the vandals).
2. He might tell his mother (Appeal to authority).
3. He could go and spray paint on his own (Join the vandals).
4. He might just run off and not tell anybody (Ignore the vandals).
5. He could tell his teacher about it and the teacher could tell the class not to do things like that (Positive social action).

Many eleven year old students generated six suggested courses of action. The following example is illustrative of many responses from the eleven year age level.

Eleven Year Age Level

Suggested Courses of Action

1. He could tell the owners of the building (Appeal to authority).
2. He could join them and do it too (Join the vandals).
3. He could tell his parents (Appeal to authority).
4. He could tell the police (Appeal to authority).
5. He could tell their parents (Appeal to authority).
6. He could walk away and do nothing about it (Ignore the vandals).

The three responses do not appear to differ greatly in quality. They contain similar classes of responses. The real difference in them lies in the number of suggestions. It would appear that older children tended to generate more suggested courses of action than younger children, but the basic quality of the suggestions remained similar from the seven to the eleven year age level.

Consequences. The quality of the consequences for the three age levels is illustrated below. The examples were selected as being typical of the responses at each age level. They have been provided to enable the quality of the responses to be compared. Suggested courses of action have been included to show how the consequences were initiated.

Seven Year Age Level

Suggested Courses of Action

1. Tell the police.
2. Take the cans away from them.
3. Tell the mayor.
4. He might join them.
5. He might tell their mums.

Consequences

1A. The police would take the boy home to their parents to be punished.
B. The boys might be put in gaol.

2A. The boys might go crying home and tell their mums.
B. The boys might follow him, watch where he put the cans and take them back again.

3A. The mayor could tell the boys not to do that again.

4A. He would spray the wall too.

5A. They might have to pay for the wall.

Nine Year Age Level

Suggested Courses of Action

1. He might join them.
2. He might tell their parents.
3. He could clean up the wall after they go away.
4. He could report it to the owner of the building.
5. He could take the paint away from the boys.

Consequences

1A. The wall would get really covered.
B. All of them would get into trouble.
C. They might run out of paint.

2A. The two boys might be spanked.
B. The parents might make them apologize.
C. They might be made to clean up the wall.

3A. The two boys might come back and mess it up again.
B. They might beat him up for cleaning the wall.

4A. The owner would punish the two boys.
B. The owner might clean it up without punishing the boys.
C. Maybe the owner would make the boys clean it up.

5A. The two boys would beat him up.
B. The boys would look for more paint.

Eleven Year Age Level

Suggested Courses of Action

1. Tell the police.
2. If it was a school he could tell the principal.
3. He could have taken the spray paint and joined in with them.
4. He could tell them to stop.
5. He could have started a fight with them.
6. He might have joined them and sprayed other buildings.
7. He might have run away and done nothing about it.

Consequences

1A. The boys might beat him up if they found out he told the police.
B. The police would probably give those two boys a record.
C. The police would find the boys and deal with them.

2A. The principal would give the boys the strap.
B. If they were in the school he might suspend them.
C. The principal might make them pay for the damage they did.

3A. They might damage many walls.
B. They could start to break things through their fooling around.
C. They would probably run off when people came.

4A. There would probably be a fight.
B. The boys would say make us.

5A. He would probably have to run off.
B. Someone could get hurt pretty bad.

6A. They would damage quite a few buildings.

7A. His conscience might bother him a lot.
B. He'd probably tell his parents.

An examination of sets of consequences from the age levels tends to strengthen the impression, gained while comparing consequences generated by the thinking style categories, that greater numbers seem allied to better quality. The quality of responses which included larger numbers of consequences seemed to provide a more penetrating approach to the problem.

The seven and nine year olds' responses above provide an example. Although both started with five suggested courses of action, the greater number of consequences generated by the nine year old student indicated that a much broader perspective on the problem had been created. More aspects of the problem were being considered. However, the seven year old student's response indicated an ability to see the consequences of actions from a variety of perspectives. Perspectives appeared to widen as age increased.

Choice of Action after Consideration of Consequences. The examination of the choices was presented in the form of percentages of the totals for each age level. Percentages seemed to present a clearer picture of the pattern of choices at each age level, and are reported in Table 40 (page 187).

The percentages did not vary substantially across the age levels, except in the class of ignoring the vandals. A much greater proportion of eleven year olds than seven or nine year olds chose to ignore the vandals. Apart from this instance, the result indicated that the age levels responded in similar fashion to the problem of vandalism as far as making choices of action was concerned. Most students at each age level chose to appeal to authority. Age did not appear to have a general effect on the classes of the choices made.

Impractical Choices. Physical intervention by the spectator was judged to be an impractical choice in the context of the problem. The percentages of students at each level, who made impractical choices, are reported in Table 41 (page 188). The percentage for the nine year old students was somewhat lower than the other two. The difference was not large. The result appeared to indicate that a similar percentage of students, at each of the seven, nine and eleven year age levels, might be expected to make impractical choices after generating courses of action and considering the consequences to them.

Choices which did not Appear in Students' Initial Suggestions. Percentages of choices which did not appear in students' initial lists of suggested courses of action are reported in Table 42 (page 189). The results indicate a progression from quite a large percentage at the seven year age level to a relatively small one at the eleven year age level.

Table 40

Percentages for Choices of Action after Consideration of Consequences at the 7, 9 and 11 Year Age Levels
N = 120

Choice of Action	Age Level 7	9	11
Appeal to Authority	61.9	65.1	52.2
Join the Vandals	0.0	0.0	4.4
Ignore the Vandals	4.7	2.3	19.5
Physical Intervention by the Spectator	16.7	11.7	15.2
Non-physical Intervention by the Spectator	16.7	18.6	8.7
Miscellaneous	0.0	2.3	0.0

Table 41

Percentages of Impractical Choices (Physical Intervention)
at the 7, 9 and 11 Year Age Levels
N = 120

Age Level	Percentage
7	16.66
9	11.70
11	15.21

Table 42

Percentages of Choices which Differed from Initially Suggested Courses of Action for the 7, 9 and 11 Year Age Levels
N = 120

Age Level	Percentage
7	38.10
9	20.93
11	10.86

The results seemed to indicate that age might have an affect on this aspect of inquiry. The differences in the percentages between the age levels are appreciable. It would appear that many younger elementary students might be expected to display some inconsistency in making decisions at the end of an inquiry or valuing process.

The Incidence of Reasoning Type Statements. The occurrence of reasoning type statements for each age level is reported in Table 43 (page 191). The percentages were very small at all age levels, but showed a progression from the seven to the nine year age level.

The result seems to indicate that elementary students might not usually offer many statements of a reasoning type, such as "if . . . then . . ." statements.

The Kohlberg Perspective

An attempt was made to classify the students' responses into Kohlberg's moral development stages at each age level. The results are reported in Table 44 (page 192). The patterns of stages for the age levels were similar to each other, and reflected the patterns produced by the categories. The largest group of students was classified at Stage 1, very few at Stage 2, with a numerous group at the Conventional level (Stages 3 and 4). The similarity of the classification at each level suggested that the ages of the students had no particular connection with the moral development stage into which they were classified.

Though examples of students' choices and reasons were provided

Table 43

Percentages of Reasoning Type Statements Generated by the 7, 9 and 11 Year Age Levels
N = 120

Age Level	Percentage
7	2.24
9	4.92
11	5.37

Table 44

Classification of the 7, 9 and 11 Year Age Levels Responses in Terms of Kohlberg's Moral Development Model
N = 120

Age Level	Stage 1	Stage 2	Stage 3	Stage 4
* 7	19	0	8	11
** 9	19	0	4	15
***11	21	2	2	14
Totals	59	2	14	40

* One No Response; One Stages 1 and 4.
** Two No Responses.
*** One Stages 1 and 4.

during examination of the categories, it was felt that several more from each age level might be of interest in terms of comparing the age levels. Ratings have been included.

Seven Year Age Level

Choice: I'd tell them to stop.
Reason: Because they were messing up a city wall and they could get into trouble for doing it (Stages 1 and 4).

Choice: If I was bigger than them, I'd beat them up. If not, I'd get my mum.
Reason: I would get heck, so why shouldn't they (Stage 1).

Choice: I'd take the cans and spray them.
Reason: Because they are not supposed to write on walls (stage 1).

Nine Year Age Level

Choice: I would tell the manager.
Reason: Because they might mess up the wall so much that the name of the building would be lost (Stage 4).

Choice: I'd run to the police.
Reason: People don't like their walls being messed up (Stage 4).

Choice: I'd go to my mum and dad about it.
Reason: So they could go to the police (Stage 1).

Eleven Year Age Level

Choice: I'd go tell the police.
Reason: I don't like to see private property get wrecked. And I don't like getting into trouble. (Stages 1 and 4).

Choice: Tell my parents and let them decide what to do.
Reason: Because they would know what to do better than I do (Stage 1).

Choice: I'd try to get the spray cans away from them and hide the cans.
Reason: That would stop them messing up the streets (Stage 4).

Summary of Analysis on Hypothesis 4: The Age Levels

The statistical examination indicated that there were significant differences between each of the seven, nine and eleven year age levels on both courses of action and consequences. This indicated that older students generated significantly more courses of action and consequences at each age level.

The examination of certain aspects of inquiry (Piagetian perspective) produced the following results:

1. Relatively little difference in the percentage of responses in each class of action across the age levels. The largest classes of suggested actions at each level were appeals to authority, joining the vandals and some kind of intervention by the spectator.

2. Relatively little variation in the choices of action across the age levels, except in the class, ignoring the vandals, where eleven year olds had a much greater percentage of choices than the other two age levels. The largest percentage at each age level chose appeals to authority.

3. Similar percentages (11-17 percent) at each age level made impractical choices.

4. Choices inconsistent with initial suggestions varied across the age levels, becoming progressively smaller from the seven to the nine year age level. The percentages of inconsistent choices ranged from 38 percent at the seven year age level, through 20 percent at the nine year level, to 10 percent at the eleven year age level. The result suggested that age might have been a factor in

the making of inconsistent choices. It would appear that elementary school students might be expected to make a substantial number of inconsistent choices in an inquiry context of the type used in this study.

5. Very few (2-5 percent) reasoning type statements were produced across the age levels.

6. The older students produced more consequences than the younger students. Greater numbers of consequences appeared to produce a better quality of response in terms of wider perspective on, and deeper penetration of, the problem.

Additional Observations

The opportunity was present to make additional observations on the performance of students categorized as high divergents. The three way analysis of variance was applied to the data for suggested courses of action and consequences. The results of this analysis are reported in Tables 45 (page 196) and 46 (page 197).

The analysis of variance produced the following results:

1. Courses of Action: a) Significant differences among the age levels; b) A significant difference on divergence across the age levels.

2. Consequences: a) Significant differences among the age levels; b) A significant difference on divergence across the age levels; c) A significant age level-divergence interaction across the age levels.

The significant differences in numbers of courses of action and

Table 45

Three Way Analysis of Variance for Age Level, Convergence and Divergence on Suggested Courses of Action

Source	S.S.	df	M.S.	F	Prob.
A	110.466	2	55.233	16.908	0.000*
B	8.533	1	8.533	2.612	0.108
AB	1.066	2	0.533	0.163	0.849
C	64.533	1	64.533	19.755	0.00002*
BC	0.833	1	0.833	0.255	0.614
AC	0.144	2	7.233	2.214	0.114
ABC	1.266	2	0.633	0.193	0.824
ERRORS	352.802	108	3.266		

* Significant at .05 level.

A = Age level B = Convergence C = Divergence

AB = Age-Convergence interaction BC = Convergence-Divergence interaction

AC = Age-Divergence interaction

ABC = Age-Convergence-Divergence interaction

Table 46

Three Way Analysis of Variance for Age Level, Convergence and Divergence on Consequences

Source	S.S.	df	M.S.	F	Prob.
A	2773.120	2	1386.560	20.255	0.0000*
B	43.200	1	43.200	0.631	0.428
AB	0.350	2	0.175	0.002	0.997
C	2430.000	1	2430.000	35.498	0.0000*
BC	4.033	1	4.033	0.0058	0.808
AC	521.449	2	260.725	3.808	0.025*
ABC	2.816	2	1.408	0.020	0.979
ERRORS	7393.03	108	68.453		

* Significant at .05 level.

A = Age level B = Convergence C = Divergence
AB = Age-Convergence interaction BC = Convergence-Divergence interaction
AC = Age-Divergence interaction
ABC = Age-Convergence-Diverence interaction

consequences were discussed in the previous section, in connection with Hypothesis 4 (The Age Levels).

The significant result on divergence indicated that students categorized as high divergents produced significantly more courses of action and consequences than low divergents at each of the age levels. This difference did not show up clearly, apparently, when differences among individual categories within each age level were being examined, until the eleven year age level.

The significant age level-divergence interaction on consequences shed further light on the performance of students categorized as high divergents. The age level-divergence interaction is reported diagramatically in Figure 4 (page 199). The averages of the means on consequences for the high divergent and low divergent categories at each age level were calculated as shown in Table 47 (page 200) to produce the diagram.

It would appear that, although significant differences on consequences did not appear between individual categories at the seven and nine year levels, the differences between the pairs on high divergent and low divergent categories at each level were, in fact, significant. The significant age level-divergence interaction indicated that the differences became progressively greater as age increased.

The analysis of variance did not reveal a significant age level-divergence interaction for courses of action, although the

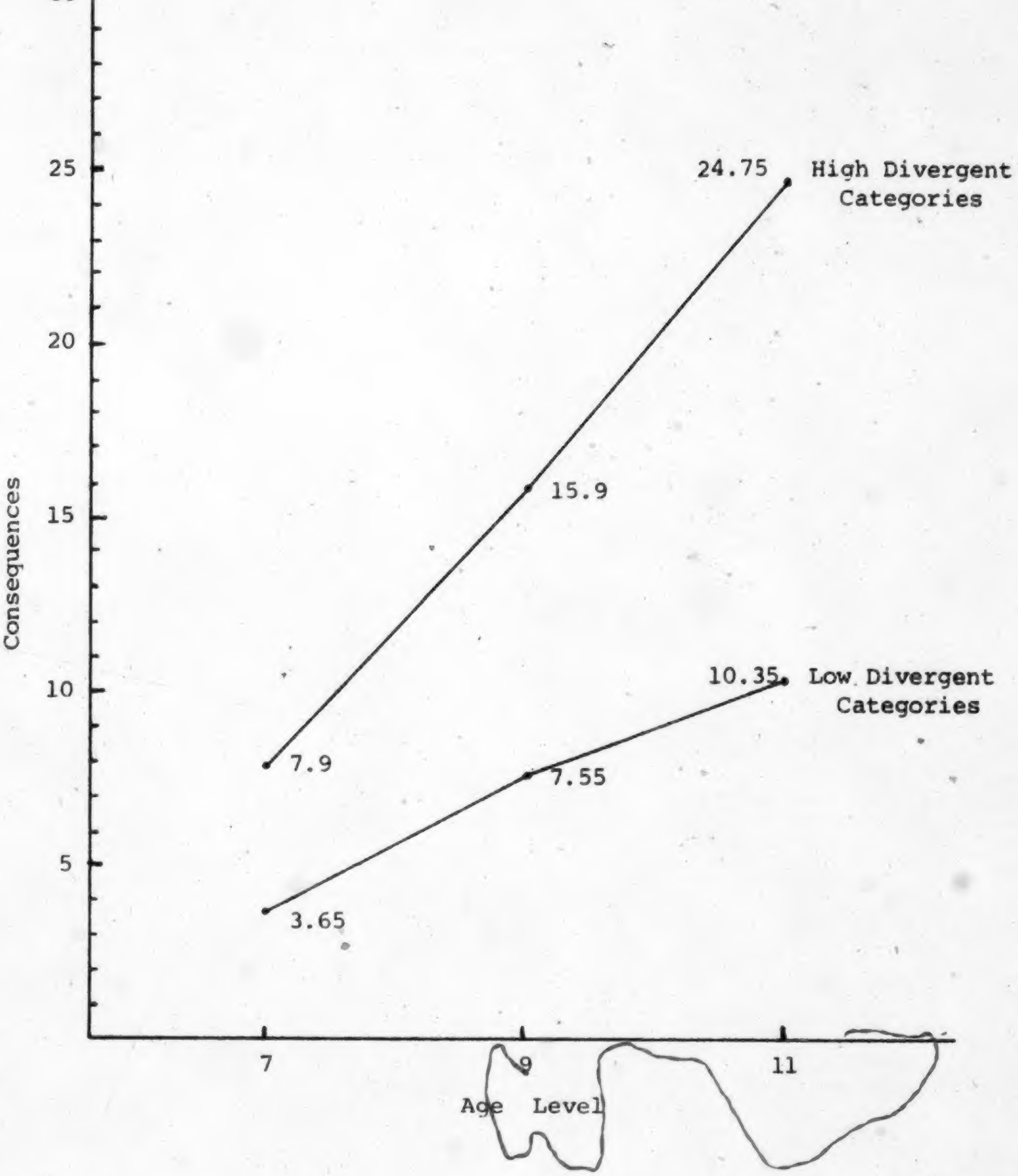

Figure 4

Interaction of Age Level and Divergence on Consequences

Table 47

Averages of Means for High and Low Divergent Categories at 7, 9 and 11 Year Age Levels N = 120

Age Level	High Divergent Categories	Low Divergent Categories
7	8.2, 7.6 7.9	4.7, 2.6 3.65
9	16.3, 15.5 15.9	8.3, 6.8 7.55
11	25.3, 24.2 24.75	10.9, 9.8 10.35

probability level was relatively low at .11.

It would seem that the higher divergent students at elementary school age levels might be expected to produce significantly more initial courses of action, and possible consequences to those actions, than lower divergent students in a social problem solving context. On consequences, it appears that not only might the differences at seven, nine and eleven year age levels be significant, but that they may also become increasingly so across those age levels.

Research Questions 1-4: Corresponding Categories across the Age Levels

The observations on these categories will be presented in similiar fashion to the examination of the categories within each age level (Hypotheses 1-3) and the age levels themselves (Hypothesis 4). The means for the corresponding categories will be discussed first. The categories will then be examined in turn from the Piagetian and Kohlberg perspectives.

Means for Corresponding Categories across the Age Levels.

The means are reported in Tables 48 (page 202) and 49 (page 203). The means for each category increased across the age levels. These means reflected the significant differences recorded amongst the age levels as wholes by the analysis of variance.

The means for the categories with the high divergent component were larger than those for the low divergent categories on both courses of action and consequences. The means reflected the significant results produced by the analysis of analysis on divergence and

Table 48

Means for Corresponding Categories on Suggested Courses of Action Across the 7, 9 and 11 Year Age Levels
N = 120

Category	Age Level 7	 9	 11
High-High	3.7	5.9	7.1
High-Low	3.3	3.9	4.6
Low-High	3.4	4.9	6.3
Low-Low	2.8	3.3	4.6

Table 49

Means for Corresponding Categories on Consequences Across the 7, 9 and 11 Year Age Levels

N = 120

Category	Age Level 7	 9	 11
High-High	8.2	16.3	25.3
High-Low	4.7	8.3	10.9
Low-High	7.6	15.5	24.2
Low-Low	2.6	6.8	9.8

age level-divergence interaction.

Research Question 1: High-High Categories Across the Age Levels

Are there any differences among seven, nine and eleven year old students designated as High Convergent-High Divergent in their ability to generate alternatives?

The Piagetian Perspective

Classes of Suggested Courses of Action. The percentages of the various classes of action suggested by the High-High students at the three age levels are reported in Table 50 (page 205).

The largest class was Appeal to Authority. The proportions of the classes at each age level did not vary greatly. The eleven year old level produced somewhat more Miscellaneous suggestions than the other two age levels. In general, age did not seem to affect the proportions of action suggested by the High-High category throughout the age levels.

The quality of the courses of action suggested by the High-High categories has been illustrated below with an example from each age level. Classifications have been included.

Seven Year Age Level (High-High)

Suggested Courses of Action

1. He could spray the wall too (Join the vandals).
2. He might tell the police (Appeal to authority).
3. He might wash the wall (Positive social action).
4. He might just watch them (Passive interest).

Table 50

Percentages of Classes of Suggested Courses of Action Generated by the High-High Category at the 7, 9 and 11 Year Age Levels
n = 30

Class of Response	Age Level 7	9	11
Appeal to Authority	35.2	32.3	33.8
Join the Vandals	27.0	25.5	25.3
Ignore the Vandals	5.4	8.4	8.4
Physical Intervention by the Spectator	13.5	11.9	9.9
Non-physical Intervention by the Spectator	8.1	15.2	9.9
Positive Social Action	5.4	3.3	4.2
Passive Interest	5.4	1.7	1.5
Miscellaneous	0.0	1.7	7.0

Nine Year Age Level (High-High)

Suggested Courses of Action

1. He could tell the boys' parents (Appeal to authority).
2. He could join them (Join the vandals).
3. He could tell them to stop messing up the wall (Non-physical intervention).
4. He could try to take the spray paint away from them, if he was strong (Physical intervention).
5. If it was a school, he could tell the principal (Appeal to authority).

Eleven Year Age Level (High-High)

Suggested Courses of Action

1. He might tell the manager of the building (Appeal to authority).
2. He might help them wash the paint off the building (Positive social action).
3. He might muck up the wall with them (Join the vandals).
4. He could tell the boys' parents (Appeal to authority).
5. If he was real nice, he might take the blame for it (Miscellaneous).
6. He might tell them to stop doing it (Non-physical intervention).
7. He might just walk right past it all (Ignore the vandals).

The three responses do not appear to vary greatly in quality. Each contains a variety of classes. The seven year old produced four different classes. The eleven year old produced six different classes. The main difference appeared to be numerical.

Consequences. The sets of suggested courses of action noted above have been taken here in conjunction with the consequences which were suggested for them. This has been done to provide examples of the consequences generated by each of the categories.

Seven Year Age Level (High-High)

Suggested Courses of Action

1. He could spray the wall too.

2. He might tell the police.
3. He might wash the wall.
4. He might just watch them.

Consequences

1A. Another boy might come and see them all doing it and he might tell the police.
B. They might all get heck.
C. They might stick paper on the wall.

2A. The boys might be put in jail.
B. They might not do anything else.

3A. The wall would be clean
B. The boys might mess it up again after it was washed.

4A. They might stop.
B. He might decide after a while to do it with them.
C. The boys might make a really big mess to show off to the boy.

Nine Year Age Level (High-High)

Suggested Courses of Action

1. He could tell the boys' parents.
2. He could join them.
3. He could tell them to stop messing up the wall.
4. He could try to take the spray paint away from them.
5. If it was a school, he could tell the principal.

Consequences

1A. The boys might lose their privileges for a month.
B. Their parents might spank them.
C. Their fathers might have made them go to bed and stay there until they were able to do things right.
D. They might have given the boys a good talking to.

2A. Another boy might have come along and told all three boys' parents.
B. They might have messed up the wall more badly.

3A. The two boys might have beaten him up.
B. They might have spray painted him.
C. The boys might have run away and started somewhere else.

4A. Maybe the two boys would be stronger than him and beat him up.

5A. They might get the strap.
B. The principal might have told their parents and they'd have been spanked at home.
C. They might have had to pay for the damages.
D. They could have got a talking to.

Eleven Year Age Level (High-High)

Suggested Courses of Action

1. He might tell the manager of the building.
2. He might help them wash the paint off the building.
3. He might muck up the wall with them.
4. He could tell the boys' parents.
5. If he was real nice, he might take the blame for it.
6. He might tell them to stop doing it.
7. He might just walk past it all.

Consequences

1A. The manager might come out and get rid of the boys.
B. The manager might make the boys wash the paint off the wall.
C. He might not believe the boy.
D. The manager might make all three of them wash the wall.
E. The manager might tell the boys to go tell the boys to stop it.

2A. He'd get the pail of water and wash the paint off.

3A. He might become friends with the two boys.
B. They might get too carried away and spray each other.
C. They might wash the paint off later on.
D. All three of them might get caught.
E. All three of them might be made to wash it off.
F. The boys might not want him to join them.

4A. The parents might not believe him.
B. The parents might get the boy to show them the wall.
C. The parents might scold the boys when they came home.
D. They might make the boys wash the wall.
E. The boys might be kept at home for a while.

5A. He'd end up washing the wall.
B. He might be excused from washing the wall because the manager thought he was nice for taking the blame.
C. The boys might not let him take the blame.

6A. They might stop doing it.
B. They might not stop doing it.
C. They could tell him to mind his own business.
D. They might beat him up.
E. They might spray paint him.
F. They might ignore what he said.

7A. The boys might sneer at him.
B. The boys might chase him with the spray paint.
C. The boys could say mean things to him.

These responses tended to strengthen the impression that greater numbers of consequences pointed to a deeper and wider approach to the problem. The eleven year old response seemed much more complex than the nine year old because of the greater number. Individual consequences did not seem to differ greatly.

Choice of Action after Consideration of Consequences. The percentages of High-High students who made choices of the various classes, at each age level, are reported in Table 51 (page 210). Very high percentages of students at the seven and nine year levels chose appeals to authority. The eleven year olds indicated a wider variety of choices, though many of them (33 percent) still chose to appeal to authority. This result may suggest that eleven year old children might not tend to appeal to authority as much as younger children.

Impractical Choices: The percentages of impractical choices made by the High-High students, at the three age levels, are reported in Table 52 (page 211). The percentages were relatively low (9-16 percent), but could not be ignored. They were fairly even across the age levels, suggesting that age was not an essential factor in the result.

Choices which Differed from Initial Suggestions. The percentages of choices which differed from students' initially suggested courses of action are reported in Table 53 (page 212). The percentages were relatively high (9-20 percent). The result suggested that a substantial number of students at the elementary level might be expected to display inconsistency in choices of action, or decisions, in a social problem setting.

Table 51

Percentages for each Class of Action Chosen by the High-High Category at the 7, 9 and 11 Year Age Levels
n = 30

Class of Response	Age Level 7	9	11
Appeal to Authority	70.0	90.9	33.3
Join the Vandals	0.0	0.0	8.4
Ignore the Vandals	20.0	0.0	33.3
Physical Intervention by the Spectator	10.0	9.1	16.6
Non-physical Intervention by the Spectator	0.0	0.0	8.4
Miscellaneous	0.0	0.0	0.0

Table 52

Percentages of Impractical (Physical Intervention) Choices of Action for the High-High Category at the 7, 9 and 11 Year Age Levels

n = 30

Age Level	Percentage
7	10.0
9	9.10
11	16.66

Table 53

Percentages of Choices which Differed from Initially Suggested Courses of Action for the High-High Category at the 7, 9 and 11 Year Age Levels

Age Level	Percentage
7	20.00
9	9.10
11	16.66

8

Reasoning Type Statements. The percentages of reasoning type statements generated by the High-High category at each age level are reported in Table 54 (page 214). The percentages were not large and did not vary greatly across the age levels. The result suggested that very few reasoning type statements might be generated by students categorized in this fashion. Age seemed to have no appreciable affect on the result.

The Kohlberg Perspective

The classification of the students' choices of action and their reasons according to Kohlberg's stages is reported in Table 55 (page 215). The result indicated that the nine and eleven year age levels in this category tended to spread more across the stages than the seven year olds, though large proportions of each level were classified at Stage 1.

An example from each of the age levels has been provided below with rating included.

Seven Year Age Level (High-High)

Choice: I'd tell a man walking by or a man in the building.
Reason: Because he could tell them to stop doing it and keep an eye on the place to see they didn't do it again (Stage 1).

Nine Year Age Level (High-High)

Choice: I would not join them. I'd tell the boys' parents.
Reason: Because they were doing something against the law (Stage 4).

Eleven Year Age Level (High-High)

Choice: I'd try to get someone to help me. Or tell my mother to stop them.

Table 54

Percentages of Reasoning Type Statements Generated by the High-High Category at the 7, 9 and 11 Year Age Levels
n = 30

Age Level	Percentage
7	5.04
9	4.53
11	5.78

Table 55

Classification of the High-High Category's Responses at the 7, 9 and 11 Year Age Levels in Terms of Kohlberg's Moral Development Model
n = 30

Age Level	Stage 1	Stage 2	Stage 3	Stage 4
7	8	0	1	1
9	4	0	2	4
11	4	1	1	4

Reason: Because I'd feel that was the best thing to do (Stage 1).

Research Question 2: High-Low Categories Across the Age Levels

Are there any differences among seven, nine and eleven year old students designated as High Convergent-Low Divergent in their ability to generate alternatives?

The Piagetian Perspective

Classes of Suggested Courses of Action. The percentages of the classes of action suggested by High-Low students at the three age levels are reported in Table 56 (page 217). The results were relatively even for the seven and nine year levels. However, the eleven year level indicated a wider variety of choices. This contrasted with the High-High category, in which the eleven year age level followed closely the pattern of the other two age levels.

The quality of the courses of action suggested by the High-Low categories has been demonstrated below in the form of an example from each age level. Classifications have been included.

Seven Year Age Level (High-Low)

Suggested Courses of Action

1. He could tell their mothers (Appeal to authority).
2. He might do what they are doing (Join the vandals).
3. He might tell the police (Appeal to authority).
4. He could tell them to stop (Non-physical intervention).

Nine Year Age Level (High-Low)

Suggested Courses of Action

1. He might tell them to throw the cans away (Non-physical

Table 56

Percentages of Classes of Suggested Courses of Action Generated by the High-Low Category at the 7, 9 and 11 Year Age Levels
n = 30

Class of Response	Age Level 7	9	11
Appeal to Authority	48.5	46.2	50.0
Join the Vandals	24.3	23.1	16.7
Ignore the Vandals	0.0	2.5	16.7
Physical Intervention by the Spectator	9.0	7.7	9.5
Non-physical Intervention by the Spectator	18.2	18.0	2.4
Positive Social Action	0.0	2.5	0.0
Passive Interest	0.0	0.0	4.7

intervention).
2. He could ask them for their names (Non-physical intervention).
3. When he found their names, he could report them to the manager (Appeal to authority).
4. He could tell the police (Appeal to authority).
5. He might spray too (Join the vandals).

Eleven Year Age Level (High-Low)

Suggested Courses of Action

1. He might act as if he was playing with them, find out their names and then tell the police (Appeal to authority).
2. He could tell the police without pretending to play with them (Appeal to authority).
3. He might forget about the whole thing (Ignore the vandals).
4. He might really join in with them (Join the vandals).
5. He might start to play with them, then try to get them away from there (Non-physical intervention).

The responses do not appear to vary greatly across the age levels. Similar suggestions of actions appeared in all of them. The corresponding categories, in this instance, do not seem to have varied greatly.

Consequences. The responses above are repeated here with the consequences that were generated in connection with them. The consequences can be compared for general quality.

Seven Year Age Level (High-Low)

Suggested Courses of Action

1. He could tell their mothers.
2. He might do what they are doing.
3. He might tell the police.
4. He could tell them to stop.

Consequences

1A. They would get into trouble.

2A. Somebody else might come along and he'd get into trouble.

3A. The police might tell their mothers.

4A. They might not stop.
 B. They might spray him.

Nine Year Age Level (High-Low)

Suggested Courses of Action

1. He might tell them to throw the cans away.
2. He could ask them for their names.
3. When he found their names, he could report them to the manager.
4. He could tell the police.
5. He might spray too.

Consequences

1A. They might throw the cans away, but go and get them again when the boy goes away.
 B. They might keep on spraying.

2A. They might not tell him their names.
 B. They might not tell him their full names.

3A. The manager might make them wash the wall off.
 B. The manager could tell their mothers.

4A. The police might catch the boys.
 B. The police could tell the boys' mothers, who would punish them.

5A. He could get caught too and all three would be in trouble.

Eleven Year Age Level (High-Low)

Suggested Courses of Action

1. He might act as if he were playing with them, find out their names and then tell the police.
2. He could tell the police without pretending to play with them.
3. He might forget about the whole thing.
4. He might really join in with them.
5. He might start to play with them, then try to get them away from there.

Consequences

1A. The two boys, after they're out of trouble might look for him and pick on him.
 B. He might get a reward.

2A. The two boys might beat him up.
 B. He might get a reward.

3A. He wouldn't get involved at all.
B. They might go after him thinking that he might tell.

4A. He could get caught.
B. He might get fined.
C. He might make new friends and find out they are swell guys.
D. He'd turn out to be like them.

5A. If he got them away in time, they wouldn't get caught.
B. They might get mad at them.

An examination of the responses seems to indicate that, with consequences, larger numbers give an impression of higher quality in terms of variety of perspectives on the problem. The nine and eleven year old students in the examples quoted above produced about the same number of consequences, and both could be said to have generated a reasonably wide perspective on the problem. The seven year old student produced less consequences, and the framework within which this student worked can be seen to be much narrower than the other two.

Choices of Action after Consideration of Consequences. The percentages of High-Low students who made choices of the various classes, at each age level, are reported in Table 57 (page 221). High percentages chose appeals to authority at each of the age levels. The percentages for the other classes varied across the age levels.

Impractical Choices. The percentages of impractical choices made by the High-Low students at the seven, nine and eleven year age levels are reported in Table 58 (page 222). The percentages (9-20 percent) were somewhat higher than for the High-High category. The results were uneven, the nine year olds producing less impractical choices than the other two age levels.

Table 57

Percentages for each Class of Action Chosen by the High-Low Category at the 7, 9 and 11 Year Age Levels
n = 30

Class of Response	Age Level 7	9	11
Appeal to Authority	70.0	63.7	58.3
Join the Vandals	0.0	0.0	0.0
Ignore the Vandals	0.0	0.0	16.7
Physical Intervention by the Spectator	20.0	9.1	16.7
Non-physical Intervention by the Spectator	10.0	27.2	8.3

Table 58

Percentages of Impractical (Physical Intervention) Choices
of Action for the High-Low Category
at the 7, 9 and 11 Year Age Levels
n = 30

Age Level	Percentage
7	20.00
9	9.10
11	16.66

Choices which Differed from Initial Suggestions. The percentages of choices which differed from suggestions which were offered initially are reported in Table 59 (page 224). The results suggested that High-Low students at the seven year age level might be expected to make more inconsistent choices than the older age levels. However, the progression in this result was not in line with the result on impractical choices for the High-High category across the age levels.

Reasoning Type Statements. The percentages of reasoning type statements generated by the High-Low category at each age level are reported in Table 60 (page 225). Although there was a progression from the seven to the nine year old level, this result was inconsistent with that for the High-High category. In general, the percentages were very low.

The Kohlberg Perspective

The classification of students according to Kohlberg's moral development stages is reported in Table 61 (page 226). The pattern of the stages was similar to the High-High students across the age levels in that three main groups emerged at Stages 1, 3 and 4. However it was inconsistent with the High-High classification in that the seven year olds tended to spread more than the eleven year olds across the stages. An example from each of the age levels has been provided below with the stage included.

Seven Year Age Level (High-Low)

Choice: I'd probably tell their mums.
Reason: Because it makes a mess and doesn't look very nice (Stage 3).

Table 59

Percentages of Choices which Differed from Initially Suggested Courses of Action for the High-Low Category at the 7, 9 and 11 Year Age Levels
n = 30

Age Level	Percentage
7	40.00
9	27.30
11	8.33

Table 60

Percentages of Reasoning Type Statements Generated by the High-Low Category at the 7, 9 and 11 Year Age Levels
n = 30

Age Level	Percentage
7	0.00
9	4.89
11	7.34

Table 61

Classification of the High-Low Category's Responses
at the 7, 9 and 11 Year Age Levels in Terms of
Kohlberg's Moral Development Model
n = 30

Age Level	Stage 1	Stage 2	Stage 3	Stage 4
7	3	0	2	5
9	4	0	1	5
11	7	0	0	3

Nine Year Age Level (High-Low)

Choice: I'd go home and tell my dad.
Reason: Because my dad would tell them off and speak to their parents (Stage 1).

Eleven Year Age Level (High-Low)

Choice: I'd go and tell the police.
Reason: Because the police are the right authority and they could stop the boys (Stage 4).

Research Question 3: Low-High Categories Across the Age Levels

Are there any significant differences among seven, nine and eleven year old students designated as Low Convergent-High Divergent in their ability to generate alternatives?

The Piagetian Perspective

Classes of Suggested Courses of Action. The percentages of the different classes of action suggested by Low-High students is reported in Table 62 (page 228). The largest percentage at each age level was Appeal to Authority. There was no particular pattern to the rest of the responses, except that the nine and eleven year old students appeared to spread somewhat more through the classes than the seven year olds.

Three sets of suggested courses of action are presented below to provide the general flavour of such responses across the age levels. Classifications have been included.

Seven Year Age Level (Low-High)

Suggested Courses of Action

1. He might just watch them (Miscellaneous).

Table 62

Percentages of Classes of Suggested Courses of Action Generated by the Low-High Category at the 7, 9 and 11 Year Age Levels
n = 30

Class of Response	Age Level 7	 9	 11
Appeal to Authority	50.0	30.6	39.0
Join the Vandals	20.6	18.4	17.2
Ignore the Vandals	2.9	6.2	9.3
Physical Intervention by the Spectator	2.9	22.4	15.6
Non-physical Intervention by the Spectator	14.8	18.4	7.9
Positive Social Action	5.9	2.0	4.6
Passive Interest	2.9	2.0	3.2
Miscellaneous	0.0	0.0	3.2

2. He might do the same thing (Join the vandals).
3. He might paint the wall properly (Positive social action).
4. He might walk away (Ignore the vandals).
5. He might stop them (Physical intervention).
6. He might phone the police (Appeal to authority).

Nine Year Age Level (Low-High)

Suggested Courses of Action

1. He could tell someone inside the building that the two boys were spraying paint all over the wall (Appeal to authority).
2. He could have a fight with one of the boys (Physical intervention).
3. He might grab a can and spray the wall too (Join the vandals).
4. If those boys were at his school, he could tell the principal.
5. He might tell them to clean up the mess (Non-physical intervention).
6. He might crush the cans (Physical intervention).

Eleven Year Age Level (Low-High)

Suggested Courses of Action

1. He could tell the owners of the building (Appeal to authority).
2. He could tell the boys' parents (Appeal to authority).
3. He could paint the wall too (Join the vandals).
4. He could try to make them stop (Physical intervention).
5. He could just ignore them and walk away (Ignore the vandals).
6. He could take the cans from them (Physical intervention).
7. He could suggest that they all do something else like play football (Non-physical intervention).,

Each response contained several different classes of suggested action. This particular group of three responses indicated the degree of sameness in general quality which could occur over the three age levels as far as generating various classes of action was concerned. The number of alternatives was much the same in each case. In other examples quoted from time to time, differences in number seemed to affect the impression of quality which they presented.

Greater numbers sometimes gave the impression of a wider perspective on the problem.

Consequences. Three sets of consequences are offered below to indicate the general impression they present. In this case, the consequences were stimulated by almost equal sets of courses of action.

Seven Year Age Level (Low-High)

Suggested Courses of Action

1. He might watch them.
2. He might do the same thing.
3. He might paint the wall properly.
4. He might walk away.
5. He might stop them.
6. He might phone the police.

Consequences

1A. They might spray him.
B. He might get the idea and do it too.
C. He might walk away after a while.

2A. They would all get heck.
B. They could start a paint fight.
C. They could mess the wall up completely.

3A. They might mess it up again.
B. They might spray the ground.
C. They might spray everything.

4A. He might tell someone later on.
B. They might spray him.
C. He could come back later and spray too.

5A. They would spray him.
B. They might spray other things like trucks.

6A. The police might put the boys in gaol.
B. The police might send them home and take the cans away.
C. They might spray him while he was phoning the police.
D. They might spray the police car.

Nine Year Age Level (Low-High)

Suggested Courses of Action

1. He could tell someone inside the building that the two

boys were spraying paint all over the wall.
2. He could have a fight with one of the boys.
3. He might grab a can and spray the wall too.
4. If those boys were at this school, he could tell the principal.
5. He might tell them to clean up the mess.
6. He might crush the cans.

Consequences

1A. The boys might beat him up afterwards.
B. The boys might get into trouble.
C. The janitor might make them clean up the mess.

2A. He might get a cut lip.
B. He might get a bleeding nose.
C. His jacket might get ripped.
D. The two boys might fight him.

3A. The two boys might be his friends then.
B. They'd start writing his initials on the wall.
C. They would keep on playing tick-tack-toe on the wall.

4A. They would get the strap.
B. The boys would get other friends and beat him up.
C. The boys might be suspended from school for two days.
D. They might have to clean up the mess.
E. Their mothers might send them to their rooms.

5A. They might start a fight.
B. They could make him clean up the mess.
C. The boy might clean it up if those two didn't.

6A. They'd use other cans.
B. They would spray him.
C. They might make a bigger mess.
D. They might start a fight.

Eleven Year Age Level (Low-High)

Suggested Courses of Action

1. He could tell the owners of the building.
2. He could tell the boys' parents.
3. He could paint the wall too.
4. He could try to make them stop.
5. He could just ignore them and walk away.
6. He could take the cans from them.
7. He could suggest that they all do something else like play football.

Consequences

1A. The owners would tell the boys' parents.

B. The boys might be made to clean up the wall.
C. The boys' parents might have to pay for the wall to be cleaned up.

2A. The parents could punish the boys.
B. They might make the boys clean up the wall.
C. The parents might pay for the wall to be cleaned up.

3A. The wall would be made messier.
B. He could be caught with the other boys and all three would get into trouble.
C. The other boys might get away before anyone else came and he might be blamed.

4A. They might not listen.
B. They could start to fight him.
C. They might stop it and clean up the wall.
D. The people in the building might come out and think he was doing it too.

5A. The other two boys would get into trouble.
B. He could be caught walking away and be blamed for messing up the wall.

6A. They would try to beat him up.
B. The owner might see them all fighting and blame him as well as the other two.
C. He could be followed by the others and no one would know who did it.

7A. They could leave and no one would be blamed.
B. They might decide to stay there.
C. They might use up all the paint and then leave.
D. He would be waiting for them and might also get into trouble.

Virtually equal sets of consequences were generated in the three responses. The seven year old response was a little less than the other two (18 to 22). All responses indicate a wide perspective on the problem. With numbers as high as these, it is difficult to differentiate in terms of general quality. The seven year old can be argued to have generated as satisfactory a consideration of the problem as the older students.

Choices of Action after Consideration of Consequences. The percentages of Low-High students who chose the various classes of action, at each age level, are reported in Table 63 (page 234). High percentages (over 50 percent) chose appeals to authority at each age level. The other classes did not appear to have been chosen according to any particular pattern.

Impractical Choices. The percentages of impractical choices made by the Low-High students at the seven, nine and eleven year age levels are reported in Table 64 (page 235). The percentages (9-30 percent) were far from negligible, and were higher than the High-High and High-Low results. The percentages were uneven across the age levels, the nine year olds making appreciably less impractical choices than the other two age levels.

Choices which Differed from Initial Suggestions. The percentages of choices which differed from suggested courses of action which were offered at the beginning of the process are reported in Table 65 (page 236). The table indicated that the seven year old students produced a much higher percentage of this type of choice than the older students. This result reflected the situation with the High-Low category.

Reasoning Type Statements. The percentages of reasoning type statements generated by the Low-High category at each age level are reported in Table 66 (page 237). There was no progression across the age levels. The percentages were, in general, very low.

Table 63

Percentages for each Class of Action Chosen by the Low-High Category at the 7, 9 and 11 Year Age Levels
n = 30

Class of Response	Age Level 7	 9	 11
Appeal to Authority	50.0	63.6	58.4
Join the Vandals	0.0	0.0	0.0
Ignore the Vandals	0.0	9.1	8.3
Physical Intervention by the Spectator	30.0	9.1	25.0
Non-physical Intervention by the Spectator	20.0	18.2	8.3

Table 64

Percentages of Impractical (Physical Intervention) Choices of Action for the Low-High Category at the 7, 9 and 11 Year Age Levels
n = 30

Age Level	Percentage
7	30.00
9	9.10
11	25.00

Table 65

Percentages of Choices which Differed from Initially Suggested Courses of Action for the Low-High Category at the 7, 9 and 11 Year Age Levels
n = 30

Age Level	Percentage
7	70.00
9	9.10
11	8.33

Table 66

Percentages of Reasoning Type Statements Generated by the Low-High Category at the 7, 9 and 11 Year Age Levels
n = 30

Age Level	Percentage
7	1.53
9	5.33
11	4.15

The Kohlberg Perspective

The classification is reported in Table 67 (page 239). The pattern of the stages was similar to the High-High and High-Low categories in that two large groups emerged in Stages 1 and 4 at each age level.

An example from each of the age levels has been provided below. Stages have been included.

Seven Year Age Level (Low-High)

Choice: I would go to the police.
Reason: Because they messed up the wall (Stage 1).

Nine Year Age Level (Low-High)

Choice: I'd tell them not to. If they didn't stop I'd go tell the police on them.
Reason: I wouldn't approve of them ruining the wall (Stage 3).

Eleven Year Age Level (Low-High)

Choice: I'd look for someone who could take charge.
Reason: Because the boys are wrecking private property (Stage 4).

Research Question 4: Low-Low Categories Across the Age Levels

Are there any differences among seven, nine and eleven year old students designated as Low Convergent-Low Divergent in their ability to generate alternatives?

The Piagetian Perspective

Classes of Suggested Courses of Action. The percentages of the various classes of action suggested by the Low-Low are reported in Table 68 (page 240). The largest percentage at each age level

Table 67

Classification of the Low-High Category's Responses
at the 7, 9 and 11 Year Age Levels in Terms of
Kohlberg's Moral Development Model
n = 30

Age Level	Stage 1	Stage 2	Stage 3	Stage 4
7	6	0	1	3
9	4	0	1	5
11	4	0	1	5

Table 68

Percentages of Classes of Suggested Courses of Action Generated by the Low-Low Category at the 7, 9 and 11 Year Age Levels
n = 30

Class of Response		Age Level	
	7	9	11
Appeal to Authority	50.0	36.4	42.8
Join the Vandals	17.8	24.3	22.4
Ignore the Vandals	0.0	3.0	10.3
Physical Intervention by the Spectator	3.6	18.2	12.3
Non-physical Intervention by the Spectator	25.0	15.1	8.2
Positive Social Action	3.6	3.0	2.0
Passive Interest	0.0	0.0	2.0

was Appeal to Authority. There was no particular pattern among the responses, overall.

A set of suggested courses of action, and their classifications, from each of the age levels is presented below to allow examination of these responses.

Seven Year Age Level (Low-Low)

Suggested Courses of Action

1. Tell them not to do it (Non-physical intervention).
2. He might take the cans off them and spray them (Physical intervention).
3. Phone the police (Appeal to authority).

Nine Year Age Level (Low-Low)

Suggested Courses of Action

1. They could tell the owner of the place (Appeal to authority).
2. He might tell them to stop it (Non-physical intervention).
3. He could try to beat them up (Physical intervention).

Eleven Year Age Level (Low-Low)

Suggested Courses of Action

1. Tell the owner of the building (Appeal to authority).
2. He might mind his own business and leave them to do what they want (Ignore the vandals).
3. Tell them to wash it off (Non-physical intervention).
4. Phone the cops (Appeal to authority).

As with the other categories, each response contained a number of different classes. When responses containing similar numbers of suggestions and a similar variety of classes of suggestions are examined, the variation in general quality does not appear to be great.

Consequences. Three sets of consequences are presented below to illustrate the general quality in this category across the age levels. The consequences were stimulated by the suggested courses of action noted in the previous section, and these courses have been included to show the full range of the responses.

Seven Year Age Level (Low-Low)

Suggested Courses of Action

1. Tell them not to do it.
2. He might take the cans off them and spray them.
3. Phone the police.

Consequences

1A. They might go away.

2A. They would fight him.

3A. The police might take them to gaol.
 B. The police could shoot them.

Nine Year Age Level (Low-Low)

Suggested Courses of Action

1. He could tell the owner of the place.
2. He might tell them to stop it.
3. He could try to beat them up.

Consequences

1A. The owner could phone the police.
 B. He could tell the kids to go away and leave the wall alone.
 C. He could tell them to pick up the garbage they threw around.

2A. They might beat him up.
 B. They could refuse to stop.
 C. He might take the cans away from them.

3A. He could get hurt badly.
 B. He could hurt them.

Eleven Year Age Level (Low-Low)

Suggested Courses of Action

1. Tell the owner of the building.
2. He might mind his own business and leave them to do what

they want.
3. Tell them to wash it off.
4. Phone the cops.

Consequences

1A. The owner of the building might make them wash it off.
B. The owner of the building could phone the police.

2A. They could keep on spraying the wall.
B. They could run off and leave the mess.

3A. They might not listen to him.
B. They could spray paint him.

4A. The boys would probably run off.

The nine and eleven year old responses appeared to indicate a relatively wider perspective on the problem than the seven year student's response, which contained appreciably less consequences than the others.

Choices of Action after Consideration of Consequences. The percentages of Low-Low students who selected the classes of action, at each level, are reported in Table 69 (page 244). High percentages (40-60 percent) chose appeals to authority at each level. Appeal to authority was the largest class at each age level. The other choices did not form any overall uniform patterns.

Impractical Choices. The percentages of impractical choices are reported in Table 70 (page 245). A relatively wide range was recorded (0-20 percent). No uniform pattern emerged. The range of percentages suggested that some elementary school students will make impractical decisions when faced with a social problem of the type used in this investigation.

Choices which Differed from Initial Suggestions. The

Table 69

Percentages for each Class of Action Chosen by the Low-Low Category at the 7, 9 and 11 Year Age Levels
n = 30

	Age Level		
Class of Response	7	9	11
Appeal to Authority	58.4	40.0	60.0
Join the Vandals	0.0	0.0	10.0
Ignore the Vandals	0.0	0.0	20.0
Physical Intervention by the Spectator	8.3	20.0	0.0
Non-physical Intervention by the Spectator	33.3	30.0	10.0
Miscellaneous	0.0	10.0	0.0

Table 70

Percentages of Impractical (Physical Intervention) Choices of Action for the Low-Low Category at the 7, 9 and 11 Year Age Levels
n = 30

Age Level	Percentage
7	8.33
9	20.00
11	0.00

percentages of choices which differed from initially suggested courses of action are reported in Table 71 (page 247). There were no uniform patterns. The range of percentages was high (10-40 percent). The result of this comparison reflected the results for the other categories. A substantial percentage of the students made choices inconsistent with their original suggestions.

Reasoning Type Statements. The percentages of reasoning type statements generated by the Low-Low category at each age level are reported in Table 72 (page 248). The percentages were very low.

The Kohlberg Perspective

The classifications are reported in Table 73 (page 249). Two main groups, at Stages 1 and 4, emerged, following the patterns for the other categories.

An example from each of the age levels has been provided below with the stages at which the responses were classified.

Seven Year Age Level (Low-Low)

Choice: Tell their mothers.
Reason: Their mothers might be able to tell somebody (Stage 1).

Nine Year Age Level (Low-Low)

Choice: I would tell them to stop.
Reason: They are making a mess of a building they didn't even own (Stage 4).

Eleven Year Age Level (Low-Low)

Choice: I'd go and get an adult.
Reason: Because they were doing the wrong thing (Stage 4).

Table 71

Percentages of Choices which Differed from Initially Suggested Courses of Action for the Low-Low Category at the 7, 9 and 11 Year Age Levels
n = 30

Age Level	Percentage
7	25.0
9	40.0
11	10.0

Table 72

Percentages of Reasoning Type Statements Generated by the Low-Low Category at the 7, 9 and 11 Year Age Levels
n = 30

Age Level	Percentage
7	1.32
9	4.96
11	4.89

Table 73

Classification of the Low-Low Category's Responses at
the 7, 9 and 11 Year Age Levels in Terms
of Kohlberg's Moral Development Model
n = 30

Age Level	Stage 1	Stage 2	Stage 3	Stage 4
* 7	2	0	4	2
** 9	7	0	0	1
***11	6	1	0	2

* 1 No Response; 1 Combination of Stages 1 and 4.
** 2 No Responses.
*** 1 Combination of Stages 1 and 4.

Summary of Research Questions 1-4: Corresponding Categories Across the Age Levels

The Means. An examination of the means indicated that they reflected the significant results provided by the analysis of variance on age and divergence for courses of action and consequences, and also for age-divergence interaction on consequences. The means for courses of action and consequences increased, for each category, across the age levels. The categories with the high divergent component produced higher mean courses of action and consequences than the low divergent categories.

The Piagetian Perspective

1. The same classes of action emerged when the corresponding categories across the age levels were examined. Appeals to authority formed the largest class for each of the categories across the age levels.

2. The quality of the classes, in individual students' responses, in terms of variety of suggested courses of action, did not vary greatly across the age levels for any of the categories. Impressions of differences in quality seemed to stem from quantity of suggestions rather than individual suggestions. Greater numbers of suggestions appeared to provide a more comprehensive view of the problem.

3. Greater numbers of consequences gave a definite impression of a wider perspective on the problem. Responses with larger numbers

of consequences seemed to have a richer framework within which to work on the problem.

4. Most students chose to appeal to authority. The percentages ranged from 40 percent to 90 percent.

5. The impractical choices ranged from nil (Low-Low, 11 years) to 30 percent.

6. Choices which differed from original suggestions ranged from 8 percent to 70 percent. No uniform pattern emerged among the categories or age levels.

7. Percentages of reasoning type statements were small for every category at each age level, the highest percentage recorded being 7 percent.

Overall, the results of the examination of the corresponding categories across the age levels from the Piagetian perspective reflected the results of the previous analysis on Hypotheses 1-4.

The Kohlberg Perspective

In general the results of the examination of corresponding categories across the age levels reflected those for the analysis of Hypotheses 1-4. Two large groups at Stages 1 and 4 emerged consistently, with a substantial proportion of students being rated at the Conventional Level (Stages 3 and 4).

CONCLUSION

The findings which resulted from the analysis of the data will be summarized and discussed in Chapter 5. The findings will be discussed along with conclusions, implications and suggestions for further research.

CHAPTER 5

SUMMARY, FINDINGS AND CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH

SUMMARY

The rationale for the study was based on the widespread belief among social studies educators that elementary school age children should be taught inquiry skills and processes, as preparation for dealing with social problems, forming values and making social decisions in a society characterized by flux and change. The study attempted to examine the ability of elementary school students with an important aspect of inquiry, the generation of alternatives. Incorporated in this examination was an attempt to assess the effects of thinking style on the generation of alternatives. The study also probed for effects, on the generation of alternatives, of developmental constraints such as those suggested by Piaget. Additionally the study attempted to investigate student decisions, after the generation of alternatives, from the Kohlberg perspective of moral development.

Students at the seven, nine and eleven year old levels, were categorized according to convergent and divergent thinking ability (thinking styles). The categorized students at each age level were presented with a social problem, depicted in a film loop, in the form of an act of vandalism. They were asked to generate alternative courses of action to cope with the problem, and alternative consequences to those actions. Having generated courses of action, and considered the consequences of the actions, each student made a choice of action and offered a reason for that choice.

Statistical analyses were applied to the quantitative aspect of the data.

The qualitative aspect of the data was examined from a perspective which was labelled Piagetian. This was in order that the influence of intellectual development, if any, on children's ability to inquire could be commented upon.

Since the problem with which the students were presented appeared to be relatively concrete, it was felt to be of interest to examine their responses in terms of various aspects of inquiry and reasoning. In this way, it was hoped that information about the performance of elementary school children (largely at the concrete operations level), when they are asked to inquire and reason about a social problem, might be obtained. In short, assuming that the sample was largely concrete operational, the study investigated the kinds of reasoning and inquiry activities which these students displayed in the context of a social problem.

The various aspects of inquiry and reasoning from which the data was viewed were:

a) The classes of action which the students suggested.
b) The choices of action which the students made.
c) Impractical choices.
d) Choices which differed from original suggestions.

e) The oocurrence of reasoning type statements.

These aspects of inquiry and reasoning emerged from a study of the students' responses. They were not an external set of criteria applied to the data. It should be noted that the investigation did not actively seek any particular kind of response. The students' responses were accepted and recorded in the form in which they were offered during individual interviews with the investigator.

The vandalism incident had moral overtones. It was felt to be useful to examine the data for moral development constraints or connections between moral development and thinking style which might affect elementary school students when they are considering social problems. This aspect of the examination of data was termed the Kohlberg perspective because Kohlberg's moral development stages were used as the framework for this part of the study.

FINDINGS AND CONCLUSIONS

The findings and conclusions are presented in terms of the statistical examination, the Piagetian perspective and the Kohlberg perspective.

The statistical examination incorporates the recording and discussion of each hypothesis in turn. The research questions are also recorded, but are commented upon as a group.

The Piagetian perspective is applied to each hypothesis in turn and to the research questions as a group. The Kohlberg perspective is applied to each hypothesis in turn and also, to the research questions as a group. The hypotheses and research questions are not recorded fully for the Piagetian and Kohlberg perspectives. They are discussed under abbreviated headings.

Statistical Examination

Hypothesis 1. There will be no significant mean differences among seven year old students designated as a) High Convergent-High Divergent b) High Convergent-Low Divergent c) Low Convergent-High Divergent and d) Low Convergent-Low Divergent in their ability to generate alternatives.

Finding. Significant differences were not registered on either courses of action or consequences, when individual categories were compared. Significant differences in favour of high divergency, however, resulted on consequences, when the categories with the high divergent component were compared with the low divergent categories. Moreover, significant differences were registered on divergence for both courses of action and consequences at the seven year age level, indicating that high divergent students produced significantly more courses of action and consequences than the low divergent students.

The hypothesis was rejected.

Conclusion. It would appear that students of higher divergent thinking ability, in a group of seven year old students, will tend to produce more alternatives in the form of suggested courses of action and consequences to those actions than students of lower divergent thinking ability. Thinking style appeared to affect the number of alternatives generated.

Hypothesis 2. There will be no significant mean differences among nine year old students designated as a) High Convergent-High Divergent b) High Convergent-Low Divergent c) Low Convergent-High Divergent and d) Low Convergent-Low Divergent in their ability to generate alternatives.

Finding. There were significant differences in favour of high divergency between the High-High and Low-Low categories on courses of action, when individual categories were compared. Significant differences, in favour of high divergence, were recorded between the pair of categories with the high divergent component and the pair of low divergent categories on consequences. Significant differences were recorded for courses of action and consequences on divergence for the nine year old age level, indicating that high divergent students generated significantly more courses of action and consequences than low divergents.

The hypothesis was rejected.

Conclusion. Students with higher divergent thinking ability, at the nine year age level, might be expected to generate more alternatives in the form of suggested courses of action and consequences, than students with lower divergent thinking ability. Thinking style appeared to affect the number of alternatives generated.

Hypothesis 3. There will be no significant mean differences among eleven year old students designated as a) High Convergent-High

Divergent b) High Convergent-Low Divergent c) Low Convergent-High Divergent and d) Low Convergent-Low Divergent in their ability to generate alternatives.

Finding. When individual categories were compared, there were significant differences, in favour of high divergency, between the following categories:

Suggested Courses of Action: High-High and High-Low
High-High and Low-Low.
Consequences: High-High and High-Low
High-High and Low-Low
High-Low and Low-High
Low-High and Low-Low.

Significant differences in favour of high divergence were recorded between the two high divergent categories and two low divergent categories on consequences. There was a significant difference on divergence for the eleven year level on both courses of action and consequences which indicated that high divergent students generated significantly more courses of action and consequences than low divergent students.

The hypothesis was rejected.

Conclusion. Students at the eleven year age level, with higher divergent thinking ability, seemed to produce more alternatives in the form of suggested courses of action and consequences than students of lower divergent thinking ability.

Hypothesis 4. There will be no mean significant differences among seven, nine and eleven year old students in their ability to generate alternatives.

Finding. There were significant differences between the seven, nine and eleven year age levels on courses of action and consequences.

The hypothesis was rejected.

Conclusion. It would seem that the capacity to produce alternatives increases with age.

Additional Observation. There was a significant age level-divergence interaction on consequences. This result indicated that the significant differences in favour of high divergence at each age level became progressively larger as age increased.

Conclusion. It would appear that higher divergent students are likely to generate progressively more alternatives in the form of consequences than lower divergent students as age increased.

Research Questions 1-4. 1. Are there any differences among seven, nine and eleven year old students designated as High Convergent-High Divergent in their ability to generate alternatives?

2. Are there any differences among seven, nine and eleven year old students designated as High Convergent-Low Divergent in their ability to generate alternatives?

3. Are there any differences among seven, nine and eleven year old students designated as Low Convergent-High Divergent in their ability to generate alternatives?

4. Are there any differences among seven, nine and eleven year old students designated as Low Convergent-Low Divergent in their ability to generate alternatives?

Finding. The means for courses of action and consequences increased for each category from the seven to the eleven year age level. The categories with the high divergent component produced higher means for courses of action and consequences than the low divergent categories.

Conclusion. The means appeared to reflect the results obtained by statistical analysis of the hypotheses. Categories at the eleven year age level tended to generate more alternatives than the same categories at the younger age levels. Categories with the high divergent component appeared to generate more alternatives than the other two categories.

Summary of Conclusions from the Statistical Examination. It would appear that both thinking style and age might have an effect on the number of alternatives generated in response to a social problem. Older students, and students with higher divergent thinking ability seem to produce more alternatives than younger students and students with lower divergent thinking ability.

The Piagetian Perspective

Hypothesis 1. The Categories within the Seven Year Age Level

Classes of Suggested Courses of Action

Finding. Each category produced the same variety of clearly defined classes of suggested courses of action. Appeal to authority formed the largest class in each category. Individual students from each category tended to produce a variety of classes of suggested courses of action, which gave the impression that the quality of the responses did not vary greatly among the categories.

Conclusion. Thinking style did not appear to affect the quality of the seven year old students' suggested courses of action.

Consequences

Finding. Individual consequences did not appear to vary markedly throughout the categories. However, greater numbers of consequences gave the impression of a wider perspective on the problem.

Conclusion. Thinking style may affect the quality of consequences, since the high divergent students appeared to produce more consequences, and larger numbers of consequences seem to imply a broader approach to the problem.

Choices of Action

Finding. The largest class of action chosen by each category was appeal to authority.

Conclusion. Thinking style did not appear to affect choice of action by the seven year old students.

Impractical Choices

Finding. The percentages of students, in each category, who made impractical choices ranged from 8.33 percent to 30.00 percent. No consistent pattern emerged among the categories.

Conclusion. An appreciable percentage of seven year old students might make impractical choices after generating courses of action and considering consequences. Thinking style did not appear to have affected the occurrence of impractical choices.

Choices which Differed from Initial Suggestions

Finding. The percentage of this type of choice among the categories ranged from 20 percent to 70 percent. The range was high. No overall uniform pattern emerged among the categories.

Conclusion. A high percentage of seven year old students appear to have a tendency to make choices of action inconsistent with initial suggestions. Thinking style did not seem to have affected the result.

Reasoning Type Statements

Finding. Very low percentages of this type of statement were produced by each category. No uniform pattern emerged among the categories.

Conclusion. It would appear that seven year old students might not offer many reasoning type statements. Thinking style did not seem to have affected the results.

Hypothesis 2. The Categories within the Nine Year Age Level

Classes of Suggested Courses of Action

Finding. The students' suggestions fell into a number of clearly defined classes. Appeal to authority was the largest class in each category. Individual student's responses tended to contain a variety of suggested classes of action, giving the impression of very little change in quality throughout the categories. However, larger numbers of possible courses of action, in response, suggested a wider perspective on the problem.

Conclusion. Thinking style did not appear to have an effect in the general quality, throughout the categories, of the suggested courses of action.

Consequences

Finding. Greater numbers of consequences appeared to indicate a more penetrating approach to the problem.

Conclusion. Thinking style could be a factor in the quality of consequences, since high divergents seemed to produce more of them than lower divergents.

Choices of Action

Finding. The class of action chosen by the most students in each category was appeal to authority.

Conclusion. Thinking style did not seem to have affected the choices made by the students.

Impractical Choices

Finding. The percentages of students in each category, who made impractical choices, ranged from 9 percent to 20 percent. The percentages were relatively even throughout the categories.

Conclusion. A noticeable percentage of nine year old students might tend to make impractical choices after generating courses of action and consequences. Thinking style did not seem to have affected the incidence of impractical choices.

Choices which Differed from Initial Suggestions

Finding. The percentages of this type of choice ranged from 9 percent to 40 percent throughout the categories. The percentages were relatively high. No consistent overall pattern emerged among the percentages.

Conclusion. An appreciable percentage of nine year old students might tend to make decisions inconsistent with initial suggested courses of action when faced with a social problem. Thinking style did not appear to have affected the result.

Reasoning Type Statements

Finding. The percentages were very small, and relatively even throughout the categories.

Conclusion. Nine year old students might not produce very many reasoning type statements. Thinking style did not seem to have affected the occurrence of this type of response.

Hypothesis 3. The Categories within the Eleven Year Age Level

Classes of Suggested Courses of Action

Finding. The courses of action suggested by the students fell into a number of clearly defined classes. Appeal to authority was the largest class in each category. Individual students' responses tended to contain a variety of classes of action.

Conclusion. Thinking style did not appear to have affected materially the quality of the courses of action suggested throughout the categories.

Consequences

Finding. Greater numbers of consequences appear to cause a difference in quality, because they seem to create an impression of a more comprehensive view of the problem.

Conclusion. Thinking style might be a factor in producing better quality responses, since higher divergent students appear to produce more than lower divergent students.

Choices of Action

Finding. Appeals to authority was chosen by most students in each category.

Conclusion. Thinking style did not seem to have affected the result.

Impractical Choices

Finding. The percentages of students in each category, who made impractical choices, ranged from nil (Low-Low) to 25 percent. The percentages, apart from the Low-Low score, were relatively even. No uniform pattern emerged.

Conclusion. A far from negligible percentage of eleven year old students might make impractical choices. Thinking style did not seem to affect the result.

Choices which Differed from Initial Suggestions

Finding. The percentages ranged from 8 to 16 percent throughout the categories. The occurrence of such responses was relatively even, and a uniform pattern did not emerge.

Conclusion. The percentage was relatively low, but could not be ignored. An appreciable percentage of eleven year old students might tend to be inconsistent when making decisions after examining a social problem. Thinking style did not appear to have affected the result.

Reasoning Type Statements

Finding. The percentages were very low, and relatively even throughout the categories.

Conclusion. It would appear that eleven year old students might not generate many reasoning type statements during an inquiry process on a social problem.

Hypothesis 4. The Age Levels

Classes of Suggested Courses of Action

Finding. When viewed from the perspective of the age levels, rather than the categories within age levels, appeals to authority formed the largest class of suggested courses of action at each age level. The other classes were spread relatively evenly throughout the age levels. Responses from the three age levels tended to contain a variety of classes of suggested courses of action.

Conclusion. Age did not appear to affect the classes of suggested courses of action offered by the students. Students at the seven, nine and eleven year age levels tend to produce much the same quality of suggested courses of action in terms of variety of classes.

Consequences

Finding. Students at the seven, nine and eleven year age levels can generate a number of consequences. The quality of consequences tended to vary according to the number generated. Greater numbers appeared to provide better quality in terms of a more comprehensive approach to the problem.

Conclusion. Age may have an effect on the quality of consequences generated by elementary students, since older students tended to produce more consequences than younger students.

Choices of Action

Finding. Appeal to authority was the largest class of choice at each age level. The other choices were spread evenly throughout the age levels, with the exception of ignoring the vandals. Eleven year olds produced a much higher proportion of this class than the younger age levels.

Conclusion. Age did not appear to have affected the choices of action in general. However, there was a suggestion that the eleven year age level might tend to favour taking no action about the problem to a greater extent than the younger age levels.

Impractical Choices

Finding. Relatively small differences were recorded among the levels for this type of choice. No uniform progression or regression occurred.

Conclusion. Age did not appear to have an effect on the making of impractical choices.

Choices which Differed from Original Suggestions

Finding. Younger students produced appreciably more of this type of choice than older students.

Conclusion. It would appear that age could have an effect on the consistency of elementary students when following through an inquiry process on a social problem.

Reasoning Type Statements

Finding. When examined from the perspective of the age levels, rather than the thinking style categories, the students were seen to have produced very few of these statements. The percentages were small and varied very little across the age levels.

Conclusion. Age did not appear to have much effect on the occurrence of this type of response.

Research Questions 1-4: Corresponding Categories across the Age Levels

Classes of Suggested Courses of Action

Finding. The courses of action suggested by the corresponding categories across the age levels fell into the same classes. Appeal to authority was the largest class suggested by all categories at each level. The other classes of suggestions were spread relatively evenly throughout the age levels.

Conclusion. Age did not appear to affect the classes of action which the students suggested.

Consequences

Finding. Examination of corresponding categories across each age level tended to support the impression that greater numbers of consequences indicated a more comprehensive view of the problem.

Conclusion. Both age and thinking style might have an effect on the quality of consequences produced by elementary children, because higher divergents and older students appeared to produce more consequences than younger students.

Choice of Action

Finding. Appeal to authority was the largest class of action chosen by all categories at each age level. No uniform pattern of choices emerged among the other classes.

Conclusion. Age did not appear to have had any appreciable effect upon the choices of action made by the students.

Impractical Choices

Finding. This type of choice appeared in various proportions in each category within each age level. The percentages of such choices ranged from 9 percent to 30 percent.

Conclusion. A substantial number of elementary students (up to 30 percent) might make impractical choices. Age did not appear to have affected the occurrence of these responses.

Choices which Differed from Initial Suggestions

Finding. The percentages for this type of response ranged from 8 percent to 70 percent. Younger students tended to produce more of them than older students.

Conclusion. Substantial numbers of elementary students (up to 70 percent of a group) might display inconsistency in making decisions at the end of an inquiry process. Age appeared to have an effect on the occurrence of this type of response.

Reasoning Type Statements

Finding. Very few statements of this type were produced by any category throughout the age levels. The percentages ranged from nil to 7 percent, and were spread relatively evenly throughout the age levels.

Conclusion. Elementary school age students might not produce very many reasoning type statements. Age did not seem to have had an effect on the occurrence of reasoning type statements.

The Kohlberg Perspective

Hypothesis 1. The Categories within the Seven Year Age Level

Finding. The students from each category were classified into Stages 1, 3 and 4. No uniform overall pattern emerged. Stage 1 contained the largest number of students.

Conclusion. Thinking style did not appear to have had an effect on the moral development classification.

Hypothesis 2. The Categories within the Nine Year Age Level

Finding. Students from each category were classified into Stages 1, 3 and 4. No overall uniform pattern emerged. Stage 1 contained the largest number of students.

Conclusion. Thinking style did not appear to have affected the classification.

Hypothesis 3. The Categories within the Eleven Year Age Level

Finding. Students from each category were classified into Stages 1, 2, 3 and 4. Very few students were classified at Stage 2. Stage 1 contained the largest number of students, according to this classification.

Conclusion. Thinking style did not appear to have affected the stages into which the students were placed.

Hypothesis 4. The Age Levels

Finding. Most students from each age level were classified into Stages 1, 3 and 4. Stage 1 contained the largest number of students according to this classification, at each age level.

Conclusion. Age did not appear to affect appreciably the stages into which the students were placed.

Research Questions 1-4: Corresponding Categories Across the Age Levels

Finding. In general, the results were in line with those produced when the classification was examined in connection with categories within the age levels and with the age levels themselves. Two large groups emerged at Stages 1 and 4, with a smaller group at Stage 3. No overall uniform pattern emerged among the stages and categories.

Conclusion. No connection appeared to emerge between thinking style and the moral development classification done in this study.

The classification of the students' responses according to Kohlberg's stages requires some comment. The results of the classification were inconsistent with expectations for the type of students who participated in the study, according to Beck (1971, p. 16). Beck noted that, in a middle class urban sample of ten year old students, one might expect the majority to be at Stage 2, many at a combination of Stages 2 and 3, and others at either Stage 1 or Stage 3.

It was felt that the terseness of the reasons given for the choices of action may have been a factor in this inconsistency. Not enough information may have been gleaned from them, for example, to establish many combinations of stages. Difficulty in discriminating between the Punishment and Obedience Orientation (Stage 1), and the Law and Order Orientation (Stage 4) was experienced. The difficulty seemed to stem from the terseness of the responses which were examined. The scarcity of Instrumental Relativist (Stage 2)

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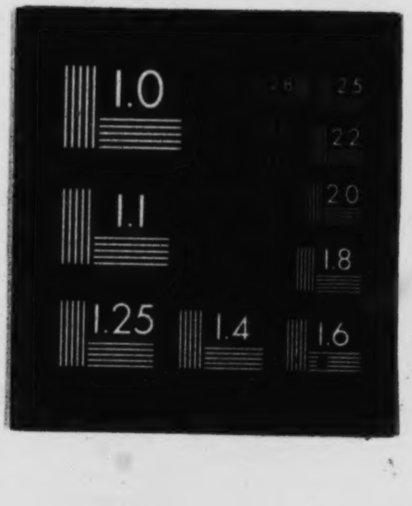
1.0
2.8
2.5
2.2
2.0
1.1
1.8
1.25
1.4
1.6

classifications may have been caused by the students masking this type of response. More discussion of the responses might have produced more classifications at Stage 2. The students choices and actions and reasons are listed in Appendix 2.

The classification done in this study did not indicate any connection between moral development and thinking style or age. Moreover, the very similar classifications at each age level suggested that teachers might have to probe quite deeply into students' thoughts and behavior to achieve fine distinctions in stages of moral development.

General Summary of Findings and Conclusions

1. Both thinking style and age appear to have an effect on the number of alternatives which elementary students might generate because,

    a) Students with higher divergent thinking ability produced more alternatives than students with lower divergent thinking ability, within the seven, nine and eleven year age levels.

    b) Older students, in general, generated more alternatives than younger students.

    c) Among students of similar thinking style categories, older students produced more alternatives than younger students.

2. Neither thinking style nor age appeared to have affected the quality of the students' responses with respect to

    a) classes of suggested courses of action

b) choices of action

c) impractical choices

d) the incidence of reasoning type statements. The results for these aspects of inquiry and reasoning were much the same, irrespective of whether they were examined in the thinking style categories within the age levels, compared across the age levels, or analysed in corresponding thinking style categories across the age levels.

3. Age, but not thinking style, appeared to have had an effect on the quality of students' responses in connection with inconsistency between final choices and initial suggestions.

4. The moral development classification done in this study yielded no connections between moral development and thinking style or age. The classification suggested that two or three moral development stages might be operational at the seven, nine and eleven year age levels.

IMPLICATIONS

The implications of the study will be discussed in two sections: a) Implications for teaching inquiry and valuing at the elementary level and b) implications for curriculum.

Implications for Teaching Inquiry and Valuing

General Instructional Strategies, Materials and Learning Climate. The ability to generate alternatives was identified as an important aspect of inquiry and valuing. The results of the study implied that teachers ought not to ignore divergent thinking ability as a factor in effective inquiry, because students of higher divergent thinking ability appeared to generate more alternatives than students of lower divergent thinking ability. A greater number of possible solutions, or courses of action, it would seem, provide a better chance of arriving at a satisfactory final solution, and a wider range of choices to be weighed.

The importance of divergency in connection with the generation of alternatives has many ramifications in connection with teaching. If inquiry and valuing processes are to be taught at the elementary level, then it would appear that instructional strategies should incorporate the provision of opportunities for the students to engage in divergent thinking ability.

Discussion type lessons, perhaps, become very important in this context. This type of lesson lends itself to allowing children to diverge and range freely in thought when considering social problems. Inquiry strategies should, perhaps, be initiated with sessions devoted to allowing students to express and classify as wide a range of opinions as possible on problem topics.

More importantly, the general tone of instructional strategies should, perhaps, have the quality of openness. Consistent encouragement of students by teachers to explore for, and test continually, further possibilities in social problem solving and valuing contexts, would appear to be an essential component of an open atmosphere in instructional strategies involving inquiry and valuing.

The performance of the higher divergent students in the study appeared to have implications for teacher behavior. Questioning techniques, for example, might be extremely important in providing opportunities for students to diverge. Open-ended type questions, coupled with an attitude of acceptance and suspended judgement by the teacher, would appear to be the sort of teacher behavior which might encourage divergence. Continued questioning which requires students to converge upon facts, (History and Geography facts, for example), or tendencies by teachers to indicate immediately that a specific answer is correct, would seem to preclude opportunities for students to diverge.

The results of the study have implications for the instructional materials which might be used in conjunction with teaching strategies. Materials which offer students the opportunity to diverge might be selected. The opportunities to diverge, which materials offer, might be a useful criterion upon which to base selection. For example, film loops depicting open-ended problem situations could be extremely valuable in this context.

It would seem that divergent thinking ability is most important at the beginning of an inquiry or valuing process. It is at this stage that competent students, either individually or in groups, set the framework for the process through which they might proceed. The breadth of perspective created at this point in an inquiry process would seem to govern the richness and diversity of the following phases. Narrower perspectives on a social problem, it would seem, tend to lessen opportunities to explore many aspects of specific problems, which might have emerged if students had been allowed to diverge more freely, or if students had developed greater divergent thinking ability.

Process Teaching. Along with general implications for instructional strategies and materials, the study appeared to have some implications for the type of performance with inquiry and valuing which teachers might expect from elementary school children; and also for the teaching of certain skills, such as hypothesizing and predicting, which are associated with inquiry.

The Performance of Elementary School Students. The results of study appeared to indicate that children within the elementary school age range seemed to be capable of generating a very satisfactory base of alternatives in the form of suggested courses of action, and consequences, in response to a social problem. Most of the youngest Low-Low children in the sample were able to suggest at least two courses of action and some consequences. This result seems to imply that elementary teachers might expect students to generate a basis of alternatives for discussion, classification, comparison, research and reporting in a social problem context.

Individual students in the sample indicated that they could produce clearly defined classes of suggested courses of action. This aspect of their performance is pertinent to both inquiry and valuing. The classes produced seemed to be genuine alternatives, thus providing a basis for inquiry and valuing as Goldmark (1968) and Raths (1966) see them, for example. In any case, the results of the study suggested that a teacher might expect a class of elementary school children to generate a number of realistic alternatives when faced with a social problem.

The choice of social problems which elementary students might be asked to consider would appear to be important. It would seem, from the experience of this study, that problems to which the students can relate personally could be essential in stimulating sensible, realistic alternatives. In this study, no fantastic or "superman" courses of action or consequences were offered by the students. This contrasted with the Clegg and Hills (1968) study where students offered bizarre alternatives in response to distant problems in American history.

The students indicated that they were capable of producing numbers of consequences sufficient to provide a satisfactory framework within which to inquire or value. Up to this point in an inquiry process, then, it seems that elementary school students might benefit from instruction involving the generation, classification and consideration of alternatives.

However, the study also indicated that many students made impractical choices or choices which had not been considered. These results appear to be indications of uncertainty and inconsistency at the solution or decision making end of inquiry and valuing processes.

This uncertainty and inconsistency seemed to indicate that many elementary school students might experience difficulty with the latter stages of inquiry processes on social problems. The presence of uncertainty and inconsistency suggested that elementary students, perhaps, should be eased into the latter phases of inquiry and valuing, rather than taken through the entire process on the assumption that they are capable of coping with it.

The results of the study indicated that elementary social studies teachers might need to direct instructional strategies towards consolidating and developing the ability to generate alternative solutions to a problem, prior to encouraging growth in the ability to come to logical decisions. The very obvious ability to generate alternatives and consequences displayed by the children in the sample suggested that many activities involving classification of alternatives, could be undertaken by elementary students. Role playing and drama activities suggest themselves as strategies for exploring consequences.

The students who participated in the investigation offered very few reasoning type statements. This result suggested that perhaps elementary school students should not be expected to achieve full reasoning mastery over inquiry processes. Perhaps instruction should focus on skills such as comparing and contrasting consequences to various possible solutions.

Hypothesizing and Predicting Skills. The study appeared to indicate that elementary students might benefit from instruction aimed at teaching them to hypothesize and predict. The classes of action which were generated can be seen as a basis for introducing students to the concept of hypothesizing about a problem. The ability to generate consequences might be used as a basis for teaching predictive skills. However, the scarcity of spontaneously offered reasoning type statements during the study suggested that, although students generated the raw material for hypothesizing and predicting, the process of getting them to perform these processes might be slow.

In general, the study indicated that many elementary school students might not be ready to achieve full mastery of inquiry or valuing processes, yet might have sufficient ability to benefit from experience and instruction in various aspects of these processes. The results of the investigation in no way preclude teachers from attempting to develop cognitive abilities after the manner of Taba, for example. They appear to indicate, however, that attempts to implement fully effective inquiry or valuing processes, especially with younger elementary students, might prove difficult.

Implications for Curriculum

The performance of the students in the study raised some questions about curriculum planning.

The validity of basing elementary social studies curriculums on inquiry or valuing might be questioned, if the curriculums require that elementary students achieve mastery over these processes. The uncertainty and inconsistency displayed by many of the students in the sample in connection with making decisions suggested that such a requirement might be inconsistent with the normal reasoning ability of many elementary students.

Inquiry and valuing both imply that decisions should be made. In the social studies context, students are asked to make decisions about social problems. The results of the study indicated that a majority of the students decided to appeal to authority. This result suggested that difficulties might occur in the full implementation of inquiry or decision making curriculums at the elementary level, if a large proportion of elementary students tend to restrict themselves to decisions involving appeals to authority.

Inquiry models appear to be based on the premise that young children think like adults. Curriculums based on full inquiry or valuing models carry this assumption. The results of the study suggested that many elementary students display inconsistency with certain aspects of inquiry, and cannot be treated like adults. It would appear that curriculum planners might consider selected aspects of inquiry, rather than full-blown models, as curriculum aims; or indicate that steady progression towards mastery of the process, rather than full and immediate implementation, is the goal for elementary students.

Finally, the effect of moral development on inquiry needs to be considered. The moral development classification in the study indicated that two or three stages of moral development might be operative in any group of elementary school children. On this point the classification appears to have been consistent with Kohlberg, though the actual stages were not. It is probable that moral development may have an effect on the decisions children make about social matters, irrespective of the results of their inquiry into social problems.

RECOMMENDATIONS FOR FURTHER RESEACH

1. Research aimed at the development of materials designed to encourage divergent thinking ability in a social studies context would appear to be useful, because higher divergent thinking ability appears to be connected to the ability to produce a wider range of alternatives.

2. Further research on, and development of, teaching strategies designed to develop the skills of observation, comparing and classifying. The performance of the students in the study indicated that elementary students seem to have the basic ability to capitalize on such instruction.

3. Research designed to probe for the effects of moral development on the decisions which elementary students make about social problems could throw further light on how young children approach social problems.

4. Further research into skills, such as inferencing and generalizing about social problems, would assist in providing more comprehensive knowledge of elementary school children's capacities with inquiry in social studies.

5. The age-divergence interaction on consequences suggested that an examination of Junior High School students' abilities in the context of inquiry and divergent thinking might provide useful comparisons with the elementary students' performance in this study.

CONCLUSION

In conclusion, the performance of the students indicated something of the richness and fertility of thought of which elementary children are capable. Although the study indicated that many of them might have difficulties in carrying through effectively a full inquiry process, their responses, especially the consequences, suggested that the older students, at least, were ready for development. Those who would argue that elementary children should have informational type curriculums appear to underrate many elementary students. It would seem that many useful and interesting activities within the frameworks of inquiry and valuing might be undertaken with them.

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APPENDICES

APPENDIX 1

WALLACH AND KOGAN INSTRUMENT

APPENDIX 1

WALLACH AND KOGAN INSTRUMENT

INSTANCES

"In this game I am going to tell you something and it will be your job to name as many things as you can think of that are like what I tell you. For example, I might say 'things that hurt.' Now you name all the things you can think of that hurt." (The experimenter then lets the child try.) "Yes, those are fine. Some other kinds of things might be falling down, slapping, fire, bruises, or a knife." (Here the experimenter varies her suggestions so that they consist of ones which the child has not provided.) "So we see that there are all kinds of different answers in this game. Do you see how we play?" (If the child already indicates strong understanding, the last sentence is replaced by, "I can see that you already know how we play this game.") "Now remember, I will name something and you are supposed to name as many things as you can think of that are like what I've said. OK, let's go."

1. "Name all the round things you can think of."
2. "Name all the things you can think of that will make a noise."
3. "Name all the square things you can think of."
4. "Name all the things you can think of that move on wheels."

ALTERNATE USES

"Now, in this game, I am going to name an object—any kind of object, like a light bulb or the floor—and it will be your job to tell me lots of different ways that the object could be used. Any object can be used in a lot of different ways. For example, think about string. What are some of the ways you can think of that you might use string?" (The experimenter lets the child try.) "Yes, those are fine. I was thinking that you could also use string to attach a fish hook, to jump rope, to sew with, to hang clothes on, and to pull shades." (The experimenter varies her suggestions so as not to duplicate any the child has provided.) "There are lots more too, and yours were very good examples. I can see that you already understand how we play this game. So let's begin now. And remember, think of all the different ways you could use the object that I name. Here we go."

1. "Tell me all the different ways you could use a newspaper."
2. "Tell me all the different ways you could use a knife."

3. "Tell me all the different ways you could use an automobile tire—either the tube or the outer part."

4. "Tell me all the different ways you could use a cork."

5. "Tell me all the different ways you could use a shoe."

6. "Tell me all the different ways you could use a button—the kind that is used on clothing."

7. "Tell me all the different ways you could use a key—the kind that is used in doors."

8. "Tell me all the different ways you could use a chair."

SIMILARITIES

"In this game I am going to name two objects, and I will want you to think of all the ways that these two objects are alike. I might name any two objects—like door and chair. But whatever I say, it will be your job to think of all the ways that the two objects are alike. For example, tell me all the ways that an apple and an orange are alike." (The child then responds.) "That's very good. You've already said a lot of the things I was thinking of. I guess you could also say that they are both round, and they are both sweet, they both have seeds, they both are fruits, they both have skins, they both grow on trees—things like that. Yours were fine, too." (The experimenter's suggestions are varied so as not to include any which the child has given.) "Do you see how we play the game?" (If the child indicates clear understanding already, the last sentence is replaced by, "I can see that you already know how to play this game.") "Well, let's begin now. And remember, each time I name two objects, you name as many ways as you can that these two objects are alike."

1. "Tell me all the ways in which a potato and a carrot are alike."

2. "Tell me all the ways in which a cat and mouse are alike."

3. "Tell me all the ways in which a train and a tractor are alike."

4. "Tell me all the ways in which milk and meat are alike."

5. "Tell me all the ways in which a grocery store and a restaurant are alike."

6. "Tell me all the ways in which a violin and a piano are alike."

7. "Tell me all the ways in which a radio and a telephone are alike."

8. "Tell me all the ways in which a watch and a typewriter are alike."

9. "Tell me all the ways in which a curtain and a rug are alike."

10. "Tell me all the ways in which a desk and a table are alike."

PATTERN MEANINGS

"Here's a game where you can really feel free to use your imagination. In this game I am going to show you some drawings. After looking at each one, I want you to tell me all the things you think each complete drawing could be. Here is an example—you can turn it any way you'd like to." (The experimenter gives the example card to the child.) "What could this be?" (The child is encouraged to try some suggestions.) "Yes, those are fine. Some other kinds of things I was thinking of were the rising sun, a porcupine, eye lashes, a brush, a carnation, and probably there are lots of other things too. And yours were very good examples too." (The experimenter's particular suggestions are varied so as not to include any given by the child.) "I can see that you already know how we play this game. So let's begin now."

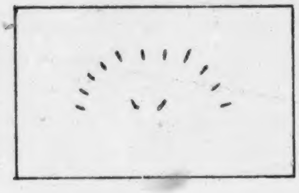
LINE MEANINGS

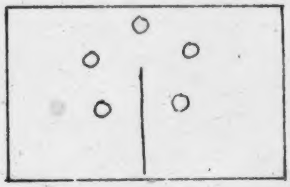
"This game is called the line game. I am going to show you some lines and after you have looked at each one, I want you to tell me all the things it makes you think of. Now take your time, and be sure that when you look at the line you tell me what the whole line makes you think of, and not just a part of it. O.K.?"

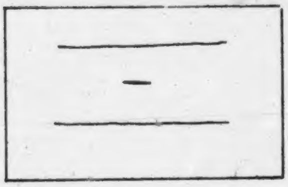
The experimenter then presents the first of the nine items in this procedure. Each line is shown on a separate 4 in. x 6 in. card. The experimenter now proceeds:

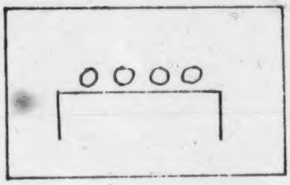
"Here is the first line. You can turn it any way you want to. Tell me all the things you can about it. What does it make you think of?"

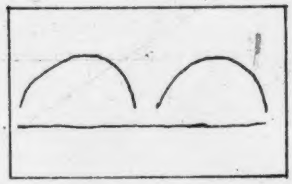
PATTERN MEANINGS

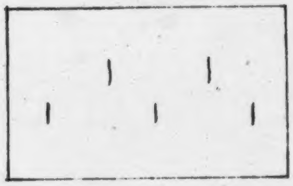


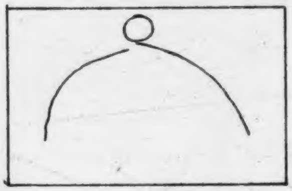


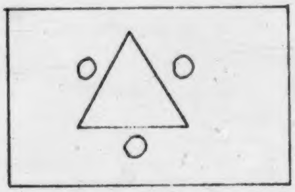


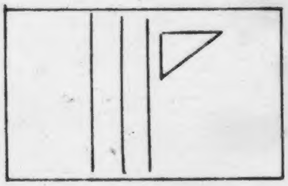




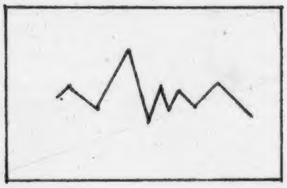


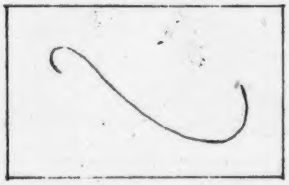


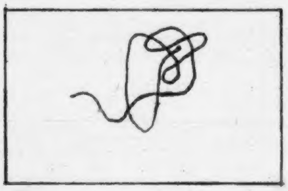


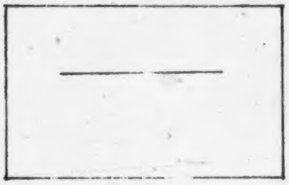


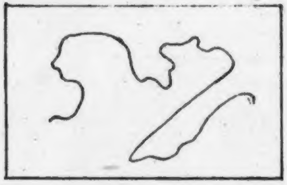
LINE MEANINGS

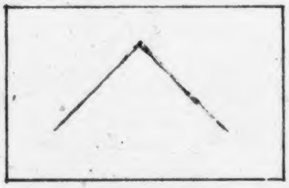


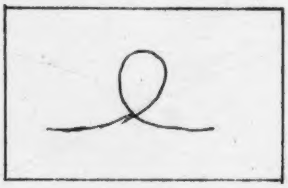


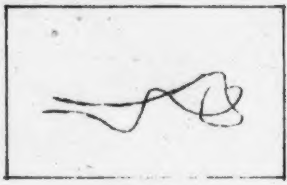


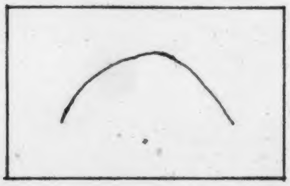












From M.S. Wallach and N. Kogan.
Modes of Thinking in Young Children.
New York: Holt, Rinehart and Winston,
pp. 29-35, 1965.

APPENDIX 2

STUDENTS' CHOICES OF ACTION AND REASONS

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SEVEN YEAR AGE LEVEL

LOW CONVERGENT-LOW DIVERGENT

Choice: I'd phone the police.
Reason: Because they weren't supposed to be spraying the wall.

Choice: Tell the boys' dads.
Reason: No response.

Choice: I would tell their parents.
Reason: Because their parents would not want them to mess up the walls.

Choice: I would tell the manager of the building.
Reason: Because it isn't nice to spray stuff on people's walls.

Choice: I would tell them not to do it.
Reason: Because they are messing up people's property.

Choice: Take the stuff away from them.
Reason: So they couldn't mess it up any more because we want the wall nice and clean.

Choice: (1) I would tell them not to do it or (2) tell the people who lived in the house or (3) tell the boys' parents.
Reason: Because it's not very nice to write on other people's walls.

Choice: I would tell them not to do that.
Reason: It would not be nice to let them keep on doing that.

Choice: I'd tell them to stop.
Reason: Because they were messing up a city wall and they could get into trouble for doing it.

Choice: Tell their mothers.
Reason: Their mothers might be able to tell somebody.

SEVEN YEAR AGE LEVEL

LOW CONVERGENT-HIGH DIVERGENT

Choice: I would tell the people in the building.
Reason: So that the boys would be too scared to do it again.

Choice: I'd fight them.
Reason: Because I might not get attention from the police.

Choice: I'd phone the police.
Reason: Maybe that's a special wall belonging to the government.

Choice: I'd phone the police.
Reason: Because littering walls isn't nice.

Choice: I'd get a pail and two cloths and tell them that I'd get the people in the building if they did not clean it up.
Reason: I don't know what else could be done.

Choice: I would hit them.
Reason: Because they were messing it up.

Choice: (1) If I was bigger than them, I'd beat them up.
(2) If not, I'd get my Mum.
Reason: I would get heck, so why shouldn't they.

Choice: I would tell the owner of the building.
Reason: Because they are not supposed to do that.

Choice: Get a good look at them, tell my Mum who would phone the police who would come and get them.
Reason: Mum would know the police number.

Choice: I would go to the police.
Reason: Because they messed up the wall.

SEVEN YEAR AGE LEVEL

HIGH CONVERGENT-LOW DIVERGENT

Choice: I'd tell their Mums.
Reason: Because they did a bad thing.

Choice: I'd tell the people who lived nearby.
Reason: Because they were putting it on the house.

Choice: I'd probably tell their Mums.
Reason: Because it makes a mess and doesn't look very nice.

Choice: Tell them to stop. Keep telling them to stop if they didn't.
Reason: Because that's an awful thing to do.

Choice: I'd tell a policeman.
Reason: Because they are doing something bad.

Choice: I'd go tell the closest adult.
Reason: Because they might run away.

Choice: I'd call a grown up.
Reason: So they would not do it any more.

Choice: I'd take the cans and spray them.
Reason: Because they are not supposed to write on walls.

Choice: I would tell the police.
Reason: Because messing up a wall like that is kind of like pollution.

Choice: I'd go and get my friends and fight them.
Reason: Because they were being bad.

SEVEN YEAR AGE LEVEL

HIGH CONVERGENT-HIGH DIVERGENT

Choice: I'd tell a man walking by or a man in the building.
Reason: Because he could tell them to stop doing it and keep an eye on the place to see they didn't do it again.

Choice: I'd go home and forget about it.
Reason: So I wouldn't get into trouble for painting on the wall and it wouldn't be on my mind all the time.

Choice: I would tell the police.
Reason: Because it's not good to litter and pollute the town by dirtying it up.

Choice: I'd tell my Mum.
Reason: Because they were messing up the wall.

Choice: I'd go away and do nothing.
Reason: Because if I stayed near, I might get into trouble too.

Choice: I'd tell their mothers if I knew them.
Reason: Because I'd know they were doing wrong. It's not nice to do that to walls and the owners would have to spend hours cleaning that stuff off.

Choice: Take them to the police.
Reason: Because they made a mess on the wall.

Choice: I'd tell my dad. He is a policeman.
Reason: Because he would give them heck and put them in jail.

Choice: I'd tell the guy who owns the building.
Reason: Because if I joined them I'd get heck too and if I tried to take the cans away they'd beat me up.

Choice: I would tell the people in the house.
Reason: Because the boys were messing up the wall.

NINE YEAR AGE LEVEL

LOW CONVERGENT-LOW DIVERGENT

Choice: I wouldn't know what to do.
Reason: I don't know.

Choice: I'd tell them to stop it.
Reason: Because all they're doing is messing up the wall and wasting spray paint.

Choice: I would tell them to stop.
Reason: They were making a mess of a building which they didn't even own.

Choice: I would tell the manager.
Reason: Because they might mess up the wall so much that the name of the building would be lost.

Choice: I wouldn't boss them around. I'd firmly tell them not to do it again, because the storekeeper will get mad. I'd advise them to tell the storekeeper that they did it and offer to clean it up.
Reason: If I got bossy they might spray me and spray paint is dangerous if it gets in your eyes.

Choice: I'd tell the owner.
Reason: Because if I went and did it too I'd get into trouble.

Choice: I'd tell a man in the building.
Reason: Because it was making the building look messy.

Choice: Kick them.
Reason. No response.

Choice: I'd take them to the police.
Reason: Because they messed up the wall.

Choice: I'd call the police.
Reason: To stop them from dirtying up the wall anymore.

NINE YEAR AGE LEVEL

LOW CONVERGENT-HIGH DIVERGENT

Choice: I'd walk by and then go to a telephone booth and call the police.
Reason: Because they were doing something wrong.

Choice: I'd probably go tell the police. Or else run. Or else tell them not to do that on the wall. The one I'd really do would be go tell the police.
Reason: Because it's against the law to do that. Also, they were wrecking a good building.

Choice: I'd tell them not to. If they didn't stop I'd go tell the police on them.
Reason: I wouldn't approve of them ruining the wall.

Choice: I'd run to the police.
Reason: People don't like their walls being messed up.

Choice: I wouldn't tell them to stop because they'd pick a fight. I'd tell the police.
Reason: Because they were wrecking someone's property.

Choice: I'd tell a grown up across the street or another grown up in the building.
Reason: Because it would look ugly if I helped them and I would get it too.

Choice: I'd go tell the Mayor or the police.
Reason: Because I wouldn't want paint put on my house wall.

Choice: When they weren't looking, I'd grab the cans and spray them.
Reason: They were messing up the wall, so now they would know what it was like to be sprayed on.

Choice: Tell them to clean it up.
Reason: Because they were making a big mess on the wall.

Choice: I'd just ignore them and not start a big fight.
Reason: If you do tell them to stop and they start a fight, and beat you up, what good have you done? Two wrongs don't make a right.

NINE YEAR AGE LEVEL

HIGH CONVERGENT-LOW DIVERGENT

Choice: Tell them to stop it.
Reason: Because they have no right to do that.

Choice: I'd report them to the manager of the building.
Reason: Because they shouldn't spray paint the walls.

Choice: I'd go and tell the police.
Reason: If they continued to do that, they'd make an awful mess of the town.

Choice: I'd tell them to stop.
Reason: Because the wall was private property.

Choice: I'd tell them to stop.
Reason: It's messing up the neighbourhood.

Choice: I'd try to stop them. If they wouldn't stop, I'd tell the police.
Reason: I don't think it's nice to mess up walls.

Choice: I'd go to my Mum and Dad about it.
Reason: So they could go to the police.

Choice: If I knew them, I'd go tell their Mum and Dad.
Reason: Their Mum and Dad might punish them.

Choice: I'd tell the owner of the building.
Reason: Because it's his wall and he should know what to do.

Choice: I'd go home and tell my Dad.
Reason: Because my Dad would tell them off and speak to their parents.

NINE YEAR AGE LEVEL

HIGH CONVERGENT-HIGH DIVERGENT

Choice: I'd ring the doorbell of the building to bring someone. I would try to stop them until someone came to the door.
Reason: When the person came he would help me keep them and phone the police to take them.

Choice: I would not join them. I would tell the boys' parents.
Reason: Because they were doing something against the law.

Choice: I'd go tell the police.
Reason: The police would tell them to stop it and they'd probably obey the police and the wall wouldn't be completely wrecked.

Choice: I'd get a policeman and make them clean it up.
Reason: Because writing on the walls is not nice and is a form of pollution.

Choice: I'd go home and phone the police.
Reason: To stop them from doing it so as to make the buildings look neat.

Choice: I'd tell the owner of the building.
Reason: So they'd be stopped and have to wash it off.

Choice: If it was a school wall, I'd tell the principal.
Reason: Because the walls don't look nice if they are spray painted and damaged like that.

Choice: I'd try to get the owner without them noticing so they wouldn't run away.
Reason: Because I would be out numbered two against one.

Choice: I'd go tell an older person.
Reason: It's not right to do something like that.

Choice: I would tell the police.
Reason: Because they were polluting the walls—making a mess of someone else's property.

ELEVEN YEAR AGE LEVEL

LOW CONVERGENT-LOW DIVERGENT

Choice: I'd tell the owner.
Reason: I'd feel guilty if I didn't tell someone. I'd feel bad if I let them wreck the wall and not be punished.

Choice: I'd mind my own business.
Reason: Because they might blame me for the mess.

Choice: I would tell their parents about it.
Reason: So their parents could talk to them instead of the police. If that didn't do any good, then I would take them to the police station.

Choice: If I knew them, I'd go tell their parents, but I wouldn't tell them to stop.
Reason: Because they might beat me up.

Choice: I'd go tell the police.
Reason: I don't like to see private property get wrecked. And I don't like getting into trouble.

Choice: I'd go get an adult.
Reason: Because they were doing the wrong thing.

Choice: Tell my parents and let them decide what to do.
Reason: Because they would know what to do better than I do.

Choice: I'd tell them that they were doing the wrong thing.
Reason: Because it was a public building.

Choice: I'd accept the can and join them.
Reason: Because it would be fun to do that.

Choice: I'd probably just walk by and say nothing.
Reason: I just wouldn't feel right telling on them.

ELEVEN YEAR AGE LEVEL

LOW CONVERGENT-HIGH DIVERGENT

Choice: I'd try to get the spray cans away from them and hide the cans.
Reason: That would stop them messing up the streets.

Choice: I'd go beat 'em up properly if they were about my age.
Reason: To teach them a lesson.

Choice: I'd tell the manager.
Reason: They wouldn't like it if people did that to their place.

Choice: I would ignore them and walk away.
Reason: I wouldn't want to get into any trouble with them. If I told on them, they might beat me up.

Choice: I'd take the cans and run to the police. Then I'd have some proof and the police wouldn't think I'd done it.
Reason: I wouldn't want to get into trouble with them.

Choice: Go and tell the police or their parents.
Reason: I wouldn't do that sort of thing because I know the consequences.

Choice: (1) I'd tell them to stop it. (2) Then I'd take the cans. (3) Then I'd tell their parents and mine.
Reason: I wouldn't like my house to be spoiled just because some boys wanted to have some fun.

Choice: I would tell my parents.
Reason: I don't think it's very nice for people to wreck up other people's property.

Choice: I'd look for someone who could take charge, like the manager of the building.
Reason: Because the boys are wrecking private property.

Choice: I'd run and go get the police.
Reason: They don't have the right to damage property which isn't theirs.

ELEVEN YEAR AGE LEVEL

HIGH CONVERGENT-LOW DIVERGENT

Choice: I'd tell the government.
Reason: Because they were damaging private property.

Choice: I'd forget about it.
Reason: I'd not get into any trouble.

Choice: (1) If they were bigger than me, I'd go tell a policeman.
(2) If I was bigger than them, I'd stop them myself.
Reason: So I could avoid being hurt and the policeman would know how to handle it better.

Choice: I'd tell the people in the building or the police.
Reason: Because they were messing up a wall which is not their property.

Choice: (1) I'd tell their mothers if I knew them. (2) If I didn't know them, I'd tell someone in the building.
Reason: If they didn't get into trouble, they'd go on and mess up more buildings.

Choice: I'd tell them to stop.
Reason: Because they could get into serious trouble.

Choice: I'd probably go away and not tell anybody.
Reason: Probably so that I wouldn't get them into trouble.

Choice: I'd tell the police or the boys' parents.
Reason: To stop them.

Choice: I'd go and tell the police.
Reason: Because the police are the right authority and they could stop the boys.

Choice: (1) I'd probably take the cans, run and put them at the bottom of the garbage where they couldn't find them.
(2) If the owner came out I'd tell him that the two boys did it.
Reason: If the owner saw them trying to find the cans in the garbage, he's probably tell their parents. I'd tell the owner so that I wouldn't get into trouble and I may receive a reward.

ELEVEN YEAR AGE LEVEL

HIGH CONVERGENT-HIGH DIVERGENT

Choice: I'd walk away.
Reason: I wouldn't want to get caught like that, because I'd get into trouble from my parents.

Choice: (1) I'd tell them not to do it. (2) If they kept on doing it, I'd go tell a parent.
Reason: That sort of thing makes the town look scuffy. There might not be enough money to repaint it.

Choice: I'd go catch 'em and take 'em to the police.
Reason: Because they are destroying someone else's property.

Choice: (1) I'd try to get someone to help me. (2) Or tell my Mother to stop them.
Reason: Because I'd feel that that was the best thing to do.

Choice: Tell the police.
Reason: It's not very nice to mess up somebody else's property.

Choice: I guess I'd just walk away and show I wasn't interested.
Reason: I don't think it's right to mess up walls.

Choice: I'd walk right by.
Reason: It's none of my business.

Choice: I'd like to join them but I'd probably just keep quiet about it.
Reason: I don't like tattling or squealing.

Choice: I'd call the cops or tell my Mum.
Reason: It's not their property and they are spoiling it.

Choice: If I knew them and they were good friends and I knew they wouldn't fink on me and it was our school, I'd join up with them.
Reason: It's fun. To see how much guts you have. I'd like to be like the other buys, not a goody-goody.

Choice: If I didn't know them and knew I could beat them up, I'd take the cans off them and then beat them up.
Reason: Cans are expensive. I have models I'd like to paint.